

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 August 2003 (21.08.2003)

PCT

(10) International Publication Number
WO 03/068961 A2

(51) International Patent Classification⁷: C12N 15/10,
15/11, C07K 14/47, C12N 15/63, 15/85, 5/10, A61K
31/713, 48/00

(74) Agent: HARRISON GODDARD FOOTE; 31 St.
Saviourgate, York YO1 8NQ (GB).

(21) International Application Number: PCT/GB03/00579

(22) International Filing Date: 12 February 2003 (12.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0203359.5 13 February 2002 (13.02.2002) GB
0203387.6 13 February 2002 (13.02.2002) GB

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): AXOR-
DIA LIMITED [GB/GB]; Firth Court, Sheffield S10 2TN
(GB).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): ANDREWS, Peter
[GB/GB]; Axordia Limited, Firth Court, Sheffield S10
2TN (GB). WALSH, James [GB/GB]; Axordia Limited,
Firth Court, Sheffield S10 2TN (GB). GOKHALE, Paul
[GB/GB]; Axordia Limited, Firth Court, Sheffield S10
2TN (GB).

Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: PLURIPOTENTIAL STEM CELLS

(57) Abstract: We describe a method to manipulate the phenotype of stem cells, preferably pluripotent stem cells including nu-
cleic acids and vectors used in said methods.



WO 03/068961 A2

ITR006
#2

Pluripotential Stem Cells

The invention relates to a method to manipulate the phenotype of stem cells, preferably pluripotential stem cells and including nucleic acids and vectors used in said methods.

A number of techniques have been developed in recent years which purport to specifically ablate genes and/or gene products. For example, the use of anti-sense nucleic acid molecules to bind to and thereby block or inactivate target mRNA molecules is an effective means to inhibit the production of gene products. This is typically very effective in plants where anti-sense technology produces a number of striking phenotypic characteristics. However, antisense is variable leading to the need to screen many, sometimes hundreds of, transgenic organisms carrying one or more copies of an antisense transgene to ensure that the phenotype is indeed truly linked to the antisense transgene expression. Antisense techniques, not necessarily involving the production of stable transfectants, have been applied to cells in culture, with variable results.

In addition, the ability to be able to disrupt genes via homologous recombination has provided biologists with a crucial tool in defining developmental pathways in higher organisms. The use of mouse gene "knock out" strains has allowed the dissection of gene function and the probable function of human homologues to the deleted mouse genes, (Jordan and Zant, 1998).

A much more recent technique to specifically ablate gene function is through the introduction of double stranded RNA, also referred to as inhibitory RNA (RNAi), into a cell which results in the destruction of mRNA complementary to the sequence included in the RNAi molecule. The RNAi molecule comprises two complementary strands of RNA (a sense strand and an antisense strand) annealed to each other to form a double stranded RNA molecule. The RNAi molecule is typically derived from exonic or coding sequence of the gene which is to be ablated.

Recent studies suggest that RNAi molecules ranging from 100-1000bp derived from coding sequence are effective inhibitors of gene expression. Surprisingly, only a few molecules of RNAi are required to block gene expression which implies the mechanism is catalytic. The site of action appears to be nuclear as little if any RNAi is detectable in the cytoplasm of cells indicating that RNAi exerts its effect during mRNA synthesis or processing.

The exact mechanism of RNAi action is unknown although there are theories to explain this phenomenon. For example, all organisms have evolved protective mechanisms to limit the effects of exogenous gene expression. For example, a virus often causes deleterious effects on the organism it infects. Viral gene expression and/or replication therefore needs to be repressed. In addition, the rapid development of genetic transformation and the provision of transgenic plants and animals has led to the realisation that transgenes are also recognised as foreign nucleic acid and subjected to phenomena variously called quelling (Singer and Selker, 1995), gene silencing (Matzke and Matzke, 1998), and co-suppression (Stam et. al., 2000).

Initial studies using RNAi used the nematode *Caenorhabditis elegans*. RNAi injected into the worm resulted in the disappearance of polypeptides corresponding to the gene sequences comprising the RNAi molecule (Montgomery et. al., 1998; Fire et. al., 1998). More recently the phenomenon of RNAi inhibition has been shown in a number of eukaryotes including, by example and not by way of limitation, plants, trypanosomes (Shi et. al., 2000) *Drosophila spp.* (Kennerdell and Carthew, 2000). Recent experiments have shown that RNAi may also function in higher eukaryotes. For example, it has been shown that RNAi can ablate *c-mos* in a mouse oocyte and also E-cadherin in a mouse preimplantation embryo (Wianny and Zernicka-Goetz, 2000).

30

During mammalian development those cells that form part of the embryo up until the formation of the blastocyst are said to be totipotent (e.g. each cell has the developmental potential to form a complete embryo and all the cells required to support the growth and development of said embryo). During the formation of the
5 blastocyst, the cells that comprise the inner cell mass are said to be pluripotent (e.g. each cell has the developmental potential to form a variety of tissues).

Embryonic stem cells (ES cells, those with pluripotentiality) may be principally derived from two embryonic sources. Cells isolated from the inner cell mass are
10 termed embryonic stem (ES) cells. In the laboratory mouse, similar cells can be derived from the culture of primordial germ cells isolated from the mesenteries or genital ridges of days 8.5-12.5 *post coitum* embryos. These would ultimately differentiate into germ cells and are referred to as embryonic germ cells (EG cells). Each of these types of pluripotent cell has a similar developmental potential with
15 respect to differentiation into alternate cell types, but possible differences in behaviour (eg with respect to imprinting) have led to these cells to be distinguished from one another.

Typically ES/EG cell cultures have well defined characteristics. These include, but
20 are not limited to;

- i) maintenance in culture for at least 20 passages when maintained on fibroblast feeder layers;
- ii) produce clusters of cells in culture referred to as embryoid bodies;
- 25 iii) ability to differentiate into multiple cell types in monolayer culture;
- iv) can form embryo chimeras when mixed with an embryo host;
- v) express ES/EG cell specific markers.

Until very recently, *in vitro* culture of human ES/EG cells was not possible. The first
30 indication that conditions may be determined which could allow the establishment of human ES/EG cells in culture is described in WO96/22362. The application

describes cell lines and growth conditions which allow the continuous proliferation of primate ES cells which exhibit a range of characteristics or markers which are associated with stem cells having pluripotent characteristics.

5 More recently Thomson *et al* (1998) have published conditions in which human ES cells can be established in culture. The above characteristics shown by primate ES cells are also shown by the human ES cell lines. In addition the human cell lines show high levels of telomerase activity, a characteristic of cells which have the ability to divide continuously in culture in an undifferentiated state. Another group
10 (Reubinoff *et. al.*, 2000) have also reported the derivation of human ES cells from human blastocysts. A third group (Shamblott *et. al.*, 1998) have described EG cell derivation.

15 A feature of ES/EG cells is that, in the presence of fibroblast feeder layers, they retain the ability to divide in an undifferentiated state for several generations. If the feeder layers are removed then the cells differentiate. The differentiation is often to neurones or muscle cells but the exact mechanism by which this occurs and its control remain unsolved.

20 In addition to ES/EG cells a number of adult tissues contain cells with stem cell characteristics. Typically these cells, although retaining the ability to differentiate into different cell types, do not have the pluripotential characteristics of ES/EG cells. For example haemopoietic stem cells have the potential to form all the cells of the haemopoietic system (red blood cells, macrophages, basophils, eosinophils etc). All
25 of nerve tissue, skin and muscle retain pools of cells with stem cell potential. Therefore, in addition to the use of embryonic stem cells in developmental biology, there are also adult stem cells which may also have utility with respect to determining the factors which govern cell differentiation. Further recent studies have suggested that some stem cells previously thought to be committed to a single fate, (e.g
30 neurons) may indeed possess considerable pluripotency in certain situations. Neural

stem cells have recently been shown to chimerise a mouse embryo and form a wide range of non-neural tissue (Clark et. al., 2000).

5 A further group of cells which have relevance to developmental biology are teratocarcinoma cells (EC cells). These cells form tumours referred to as teratomas and have many features in common with ES/EG cells. The most important of these features is the characteristic of pluripotentiality.

10 Teratomas contain a wide range of differentiated tissues, and have been known in humans for many hundreds of years. They typically occur as gonadal tumours of both men and women. The gonadal forms of these tumours are generally believed to originate from germ cells, and the extra gonadal forms, which typically have the same range of tissues, are thought to arise from germ cells that have migrated incorrectly during embryogenesis. Teratomas are therefore generally classed as germ
15 cell tumours which encompasses a number of different types of cancer. These include seminoma, embryonal carcinoma, yolk sac carcinoma and choriocarcinoma.

The similar biology of EC cells with ES/EG cells has been exploited to study the developmental fates of cells and to identify cell markers commonly expressed in EC
20 cells and ES/EG cells. For example, and not by way of limitation, the expression of specific cell surface markers SSEA-3 (+), SSEA-4 (+), TRA-1-60 (+), TRA-1-81 (+) (Shevinsky *et al* 1982; Kannagi *et al* 1983; Andrews *et al* 1984a; Thomson *et al* 1995); alkaline phosphatase (+) (Andrews et. al., 1996); and Oct 4 (Scholer et. al., 1989; Kraft et. al., 1996; Reubinoff et. al., 2000; Yeom et. al., 1996).

25 It is well known that gene expression can be affected at many levels. For example, at the level of transcription, translation or post-translationally by modifications to proteins which confer an altered biological activity to the modified protein. It is also known that the way in which DNA is packaged as chromatin can influence the
30 expression of genes.

There are several levels of structural packaging of DNA leading from a double stranded helix to a mitotic chromosome, after which the DNA is some ~50,000 times shorter than its extended length (Alberts *et al.*, 1998). Double-stranded helical DNA is wound around the structural unit of a nucleosome, comprising an octamer core composed of 4 types of histones: two each of the H2A, H2B, H3, and H4 proteins. Approximately 166 base pairs are bound to the nucleosome through electrostatic forces between the negatively charged phosphate groups in the DNA backbone and positively charged amino acids (e.g., lysine and arginine) in the histone proteins (Wolfe, 1993). Whilst the majority of the base pairs are tightly bound to the octamer core, the remaining linker DNA (80-100bp) that separates adjacent core particles is associated with the H1 histone or a related "linker" histone (Finch and Klug, 1976; Thoma *et al.*, 1979; Wolfe, 1993).

Nucleosomes are organised into the next structural level of the chromatin fibre, also referred to as a solenoid. Chromatin structure is not static and the regulated alteration in structure is termed 'chromatin remodelling'. This process has been defined as any event that alters the nuclease sensitivity of a region of chromatin, and can occur independently or in concert with processes such as transcription (Aalfs & Kingston, 2000). For a comprehensive review of chromatin remodelling see Aalfs & Kingston, 2000.

Reversible acetylation of evolutionary conserved lysine residues in core histone proteins plays a critical role in transcriptional regulation, cell cycle progression, and developmental events. The steady state of histone acetylation is controlled by the enzymatic activities of multiple histone acetyltransferases (HATs) and histone deacetylases (HDACs). Histone hyperacetylation is associated with transcriptional activity while histone hypoacetylation correlates with transcriptional quiescence and so histone deacetylases can be considered as enzymatic transcriptional repressors. Histone deacetylases were first described by Inoue & Fujimoto, 1969.

In general, histone deacetylases do not target genes directly through specific DNA-binding sites. Rather, deacetylases are localized to genes targeted for repression as part of a protein complex. Other proteins that are part of this complex, termed co-repressors, are responsible for targeting the genes to be repressed. A large number of such co-repressors have been identified to date, including the thyroid hormone receptor, Sin3, SMRT, mYY1, and MeCP2, for a comprehensive review see Pazin & Kadonaga, 1997.

In humans, four highly homologous class I HDAC enzymes (HDAC1, HDAC2, HDAC3, and HDAC8) have been identified to date, with HDAC1, HDAC2 and HDAC3 being ubiquitously expressed in many different cell types (Yang *et al.*, 1997 and 2002). HDAC1 and HDAC2 are the human orthologues of the yeast transcriptional regulator RPD3. Analysis of the predicted amino acid sequence of HDAC3 revealed an open reading frame of 428 amino acids with a predicted molecular mass of 49 kDa.

The HDAC3 protein is 50% identical in DNA sequence and 53% identical in protein sequence compared with the previously cloned human HDAC1. Comparison of the HDAC3 sequence with human HDAC2 also yielded similar results, with 51% identity in DNA sequence and 52% identity in protein sequence (Yang *et al.*, 1997). The expressed HDAC3 protein is functionally active because it possesses histone deacetylase activity, represses transcription when tethered to a promoter, and binds transcription factor YY1. Although HDAC3 shares some structural and functional similarities with other class I HDACs, it exists in multi-subunit complexes separate and different from other known HDAC complexes, implying that individual HDACs might function in a distinct manner (Yang *et al.*, 2002). Within the HDACs there are three regions of highly conserved amino acid residues; histidines, aspartates and glycines, irrespective of the highly divergent nature of the C-terminal regions (Hassig *et al.*, 1998). It is presumed that these regions form part of the active site and are also involved in maintaining interactions between HDACs and members of the co-repressor complex.

In *Drosophila*, active and silent states of developmentally regulated loci are maintained by *trithorax* and *Polycomb* group of proteins. Proteins of the polycomb and trithorax groups act to remodel chromatin by altering the accessibility of DNA to factors required for gene transcription. The PcG proteins are required to maintain the transcriptionally inactive state, whereas the trxG proteins are necessary to counteract silencing and maintain the transcriptionally active state. Both PcG and trxG proteins are thought to function by establishing closed or open chromatin configurations at their target genes

In humans, homologues of the members of the *Drosophila* polycomb group (Pc-G) proteins include; the YY1 transcription factor (YY1), the chromobox 2 gene (CBX1) and the PHD finger protein 1, transcript variant 2 (PHF1) gene. Pc-G proteins are usually considered to be inhibitors of homeotic genes. Pc-G mutants were originally identified on the basis of their causing expression of homeotic genes in unusual (ectopic) locations. This ectopic expression of genes was attributed to the failure of proper gene silencing. Pc-G proteins themselves are unable to bind to DNA, their action is dependent on their association with other chromosomal proteins, especially histones. It is suggested that the initial repression of a gene is carried out by transcription factors which have the ability to recognize DNA and that Pc-G proteins then provide a mechanism where this initial repression becomes permanent by assembling at this site and forming a multiprotein complex involved in modifying chromatin.

In humans, homologues of the members of the *Drosophila* Trithorax (TRX) proteins, for example an enhancer of polycomb 1 (EPC1), a zinc finger protein 144 (MEL18) and a myeloid/lymphoid or mixed lineage leukemia 1 (MLLT1) are considered to be activators of homeobox genes. Mutations within *trx* genes result in transformations of body structures reminiscent of loss-of-function mutations in homeotic genes. For example, in the *Drosophila*, after the disappearance of the transiently acting patterning factors such as those encoded by the segmentation genes, maintenance of

the initial transcriptional patterns of homeotic genes requires the expression of the *trx* gene. (Orlando *et al.*, 1998). Genetic analyses indicate that *trx* expression is required continuously throughout *Drosophila* development, consistent with its maintenance function, but there also appears to be a critical early requirement, which if
5 compromised cannot be compensated by subsequent continuous expression (Ingham and Whittle, 1980). Comparatively little is known about the molecular environment in which the TRX protein is integrated. However, an elucidation of this issue could be particularly rewarding as chromosomal aberrations involving the human homologues of TRX (MLL, ALL-1, HRX) is one of the most frequent genetic
10 changes in infant leukemias of myeloid and lymphoid lineage and in treatment-induced secondary leukemias (Orlando *et al.*, 1998).

Whereas some multi-protein complexes which alter transcriptional regulation and chromatin remodelling are based on the covalent modification of the histones (e.g.
15 histone acetyltransferases (HATs) and histone deacetylases, others appear to function by altering chromatin structure in an ATP dependent fashion (e.g. the yeast SWI/SNF complex). A group of enzymes referred to as ATP-dependent chromatin remodellers, use the energy of ATP hydrolysis to alter interactions between DNA and histone proteins. The protein complexes that mediate ATP-dependent nucleosome
20 remodelling and histone acetylation/deacetylation in the regulation of transcription were initially considered to be different, although it has recently been suggested that their activities might be coupled. Examples of human ATP-dependent chromatin remodellers include, SMARCA5, a human SWI/SNF related, matrix associated and actin dependent regulator of chromatin, identified as member 5 of subfamily 'a' of
25 the SMARC family.

There are further examples of regulators of gene expression. We have accumulated expression studies which identify a number of genes thought to be involved in determining the developmental fate of stem cells, particularly embryonic stem cells.
30 By northern blotting we have identified the expression of human homologs of two signalling pathways believed to be critical in cell fate determination. Expression of

ligands, receptors and downstream components of the Notch and Wingless signalling cascades have been elucidated. Using the model system NTERA2/D1 embryonal carcinoma cells we have recorded changes in the expression of some of these components as the cells differentiate. Bearing in mind the role these cascades play in embryonic development throughout the animal kingdom, these changes suggest a significant role for both the wingless and Notch signalling pathways in differentiation of stem cells. Furthermore the activity of some genes are required for differentiation to occur along specific pathways e.g. the myogenic gene MyoD1. Other genes have activity which inhibits cellular differentiation along particular pathways. We envisage regulation of stem cell differentiation to yield a specific cell type could be achieved by:

- (i) inhibition of certain genes that normally promote differentiation along particular pathways; therefore promoting differentiation to alternate cell phenotypes;
- (ii) inhibition of gene activity that prevents differentiation into particular cell types; and
- (iii) a combination of (i) and (ii), see figure 1

The differentiation of stem cells during embryogenesis, during tissue renewal in the adult and wound repair is under very stringent regulation: aberrations in this regulation underlie the formation of birth defects during development and are thought to underlie cancer formation in adults. Generally, it is envisaged that such stem cells are under both positive and negative regulation which allows a fine degree of control over the process of cell proliferation and cell differentiation: excess proliferation at the expense of cell differentiation can lead to the formation of an expanding mass of tissue – a cancer – whereas excess differentiation at the expense of proliferation can lead to the loss of stem cells and production of too little differentiated tissue in the long term, and especially the loss of regenerative potential. Certain genes have already been identified to have a negative role in preventing stem cell differentiation. Such genes, like those of the Notch family, when mutated to acquire activity can

inhibit differentiation; such mutant genes act as oncogenes. On the contrary, loss of function of such genes on their inhibition results in stem cell differentiation. We propose to use EC cells as our model cell system to follow the effects of RNAi on cell fate.

5

In our co-pending application, WO02/16620, discloses RNAi molecules derived from the following nucleic acid sequences which encode the following polypeptides; human Notch 1(hNotch); hNotch 2; hNotch 3; hNotch 4; TLE-1; TLE-2; TLE-3; TLE-4; TCF7; TCF7L1; TCFFL2; TCF3; TCF19; TCF1; mFringe; IFringe; rFringe; sel 1; Numb; Numblake; LNX; FZD1; FZD2; FZD3; FZD4; FZD5; FZD6; FZD7; FZD8; FZD9; FZD10; FRZB, D11-1; D113; D114; Dlk-1; Jagged 1; Jagged 2; Wnt 1; Wnt 2; Wnt 2b; Wnt 3; Wnt 3a; Wnt5a; Wnt6; Wnt7a; Wnt7b; Wnt8a; Wnt8b; Wnt10b; Wnt11; Wnt14; Wnt15, SFRP1; SFRP2; SFRP4; SFRP5; SK; DKK3; CER1; WIF-1; DVL1; DVL2; DVL3; DVL1L1;mFringe; IFringe; rFringe; sell1; Numb; LNX Oct4; NeuroD1; NeuroD2; NeuroD3; Brachyury; MDFI, CIR, DLK1; Oct 4; RBPJk. The present application disclaims these genes the sequences of which are disclosed in WO02/16620.

One further family of genes are the HES and related genes which are direct targets of Notch signaling. Binding of Notch ligands to Notch receptor causes proteolytic cleavage of the receptor (Mumm and Kopan, 2000). The cleaved receptor known as Notch-intracellular domain (NICD) translocates to the nucleus and binds to RBP-Jk. This binding changes RBP-Jk from a repressor to an activator of its target genes. The target genes are homologs of the genes found at the Drosophila Enhancer of Split complex (E(spl)). These basic helix-loop-helix (bHLH) transcription factors act as repressors of downstream tissue specific transcription factors and as such act as notch effectors. The Notch signaling through E(spl) complex genes represses certain tissue specific transcription factors.

The E(spl) family of proteins are class three bHLH factors. These include: HES1, HES2, HES4, HES6, HES7, HERP1, HERP2, HESR1, HEY1, HEY2, HEYL HRT1, HRT2, HRT3 CHF1, CHF2 GRIDLOCK.

The various members of the HES related genes encode proteins that are homologous in key motif regions. They all contain Basic helix-loop-helix and a so called orange domain. HES family members contain a terminal WRPW domain and HEY family proteins contain YRPW or closely related residues. Figure 1 shows an alignment of human HES related proteins illustrating the major domains contained in the HES related proteins. ES/EC differentiation go through a precursor stage for example neural differentiation (Przyborski et. al., 2001) during differentiation to the numerous lineages that can form *in vitro*.

10

Notch signaling through E(spl) homologs possibly allows precursor cells to remain as precursors. In addition Notch may also play an instructive role in specifying cell types. for example (Hojo et. al., 2000). Manipulation of the E(spl) homologs and other downstream targets which directly affect these processes would alter the notch signaling in target cells. This in turn would alter the balance between cells types. This could be manipulated to for example block a particular cell type forming by stopping the instructive signaling or by increasing or removing the precursor cells from the cultures. The E(spl) complex genes are potential targets which would allow cell type specific disruption of Notch signaling in differentiating cultures of stem cells.

20

According to an aspect of the invention there is provided a method to modulate the differentiation state of a stem cell comprising the steps of:

- i) contacting a stem cell with at least one inhibitory RNA molecule (RNAi) comprising a sequence of a gene which mediates at least one step in the differentiation of said cell;
- (ii) providing conditions conducive to the proliferation of the cell treated in (i) above; and optionally
- (iii) maintaining and/or storing said cell.

30

The term modulate includes both promoting or inducing the differentiation of a stem cell into a lineage restricted stem cell or a differentiated cell or to maintain a stem

cell as a stem cell with characteristics which are typical of stem cells, particularly embryonic stem cells. For example, maintenance in culture for at least 20 passages when maintained on fibroblast feeder layers; production of embryoid bodies in culture; the ability to differentiate into multiple cell types in monolayer culture; can
5 form embryo chimeras when mixed with an embryo host; and express ES/EG cell specific markers.

In a preferred method of the invention said method is an *in vitro* method.

10 In an alternative preferred method said method is an *in vivo* method.

In a further preferred method of the invention said stem cell is selected from the group consisting of: haemopoietic stem cells; neural stem cells; bone stem cells; muscle stem cells; mesenchymal stem cells; trophoblastic stem cells; epithelial stem
15 cells (derived from organs such as the skin, gastrointestinal mucosa, kidney, bladder, mammary glands, uterus, prostate and endocrine glands such as the pituitary); endodermal stem cells (derived from organs such as the liver, pancreas, lung and blood vessels); embryonic stem (ES) cells; embryonal germ (EG) cells.

20 In a further preferred method of the invention said stem cells are embryonal carcinoma cells. Preferably said embryonal carcinoma cells are TERA2 cells. Ideally said embryonal carcinoma cells are NTERA 2 cells.

In a further preferred method of the invention said stem cell is an embryonic stem
25 cell or embryonal germ cell or an embryonal carcinoma cell.

In a preferred method of the invention said gene is involved in Notch/Wnt signalling.

In a preferred method of the invention said RNAi molecule is derived from a nucleic
30 acid molecule comprising a nucleic acid sequence selected from the group consisting of:

- i) a nucleic acid sequence as represented by table 1, or fragment thereof;
- ii) a nucleic acid sequence which hybridises to the nucleic acid sequence of table 1 and which modulates stem cell differentiation;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

In a preferred method of the invention said hybridisation conditions are stringent hybridisation conditions.

Typically, hybridisation conditions uses 4 – 6 x SSPE (20xSSPE contains 175.3g NaCl, 88.2g $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ and 7.4g EDTA dissolved to 1 litre and the pH adjusted to 7.4); 5-10x Denhardt's solution (50x Denhardt's solution contains 5g Ficoll (type 400, Pharmacia), 5g polyvinylpyrrolidone and 5g bovine serum albumen; 100 μg -1.0mg/ml sonicated salmon/herring DNA; 0.1-1.0% sodium dodecyl sulphate; optionally 40-60% deionised formamide. Hybridisation temperature will vary depending on the GC content of the nucleic acid target sequence but will typically be between 42 $^{\circ}$ - 65 $^{\circ}$. It is well known in the art that optimal hybridisation conditions can be calculated if the sequences of the nucleic acid is known. For example, hybridisation conditions can be determined by the GC content of the nucleic acid subject to hybridisation. Please see Sambrook *et al* (1989) Molecular Cloning; A Laboratory Approach. A common formula for calculating the stringency conditions required to achieve hybridisation between nucleic acid molecules of a specified homology is:

$$T_m = 81.5^{\circ} \text{C} + 16.6 \log [\text{Na}^+] + 0.41 [\% \text{G} + \text{C}] - 0.63 (\% \text{formamide}).$$

In a preferred method of the invention said RNAi molecule is derived from a nucleic acid sequence encoding a Notch receptor processing factor polypeptide selected from the group consisting of: Nrarp; P300; presenilin associated protein; presenilin 1; presenilin 2; or Sel-1.

In an alternative preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a Notch target gene selected from the group consisting of: HERP1; HERP2; HES1; HES 2; HES 4; HES6, HES7, HERP1, HERP2, HESR1, HEY1, HEY2, HEYL HRT1, HRT2, HRT3 CHF1, CHF2
5 GRIDLOCK.

In a preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of:

- 10 i) a nucleic acid sequence as represented by the sequences in SEQ ID NO: 7-23, or fragment thereof;
- ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of SEQ ID NO: 7-23 and is a Notch-signalling target gene;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a
15 result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

In a further alternative preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt ligand processing factor selected from the group consisting of: LRP1; LRP2; LRP3; LRP4; LRP5; LRP6;
20 LRP8; or Porcupine.

Alternatively said RNAi molecule is derived from a nucleic acid molecule encoding an extracellular Wnt antagonist selected from the group consisting of: Dkk1; Dkk2; Dkk3; Dkk4; Frzb; or SARP1.

25

In a further preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt cytoplasmic acting component selected from the group consisting of: APC; Axin1; Axin2; FRAT1; GSK3; ICAT; IDAX; Par 1; or TAB1.

30

Alternatively, said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt nuclear acting component selected from the group consisting of: β -catenin; β -TRCP; CBP; CTBP1; HBP-1; Lef1; NLK; Pontin 52; Reptin 52.

- 5 In a yet further alternative method of the invention said RNAi molecule is derived from a nucleic acid molecule which encodes a Wnt target gene selected from ASCL 1 or ASCL 2.

- 10 In a yet still further preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule selected from the group consisting of: FGF 5; msx 1; neurogenin 1; neurogenin 2; neurogenin 3; or PTEN.

- 15 In an alternative preferred method of the invention said RNAi molecule is derived from a gene which encodes a polypeptide involved in modifying chromatin conformation.

- In a preferred method of the invention said RNAi molecule is derived from a nucleic acid sequence which encodes a polypeptide which modifies a histone polypeptide. Preferably said histone modifying polypeptide is a histone deacetylase. Preferably
20 said RNAi is derived from a mammalian class I histone deacetylase.

In a preferred method of the invention said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of:

- 25 i) a nucleic acid sequence as represented by the sequences in Table 4, or fragment thereof;
ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of Table 4 and which has histone deacetylase activity;
iii) a nucleic acid sequence which comprise sequences which are degenerate as a
30 result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

Preferably said histone deacetylase is selected from the group consisting of: HDAC1; HDAC2; HDAC3; HDAC 4; HDAC5; HDAC6; HDAC7; HDAC8; hSIRT2; hSIRT3; hSIRT4; hSIRT5; hSIRT6; hSIRT7; MECP2; ZNF145; TFDP1; SAP30; SAP18; RBBP7; RBBP4; RB1; MEN1.

5

Alternatively, said histone modifying polypeptide is a histone acetyltransferase selected from the group consisting of:

- i) a nucleic acid sequence as represented by the sequences in Table 5, or fragment thereof;
- 10 ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of Table 5 and which has histone acetyltransferase activity;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

- 15 In a preferred method of the invention said histone acetyltransferase is selected from the group consisting of: Gcn 5; Gcn5L2; PCAF; MOZ; HBO; CBP; SCR-1; pGRIP; ATF-2; and HAT1.

- 20 In a further preferred method of the invention said RNAi molecule comprises a nucleic acid sequence derived from a gene selected from the group consisting of:

- i) a nucleic acid sequence as represented by the sequences in Table 2, or fragment thereof;
- 25 ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of Table 2 and which mediates chromatin conformation;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

- 30 In a preferred method of the invention said nucleic acid encodes a polypeptide which mediates chromatin conformation selected from the group consisting of: EED; YY1;

CBX1; CBX6; HPC2(CBX4); HPC3(CBX8); PHF1; PHF2; HPH1; HPH2; SSX1; and SSX2.

In a further preferred method of the invention said RNAi molecule comprises a
5 nucleic acid sequence derived from a gene selected from the group consisting of:

- i) a nucleic acid sequence as represented by the sequences in Table 3, or fragment thereof;
- 10 ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of Table 3 and which mediates chromatin conformation;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

In a preferred method of the invention said nucleic acid encodes a polypeptide which
15 mediates chromatin conformation selected from the group consisting of: EPC1; EZH1; EZH2; BMI1; MEL18; SCML1; SCML2; RING1; RYBP; MLL; MLLT1; MLLT7; MLLT6; MLLT4; MLLT3; MLLT2; MLLT10; and MLL2.

In a further preferred method of the invention said RNAi molecule comprises a
20 nucleic acid sequence derived from a gene selected from the group consisting of:

- i) a nucleic acid sequence as represented by the sequences in Table 6, or fragment thereof;
- 25 ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of Table 6 and which mediates chromatin conformation;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

In a preferred method of the invention said nucleic acid encodes a polypeptide which
30 mediates chromatin conformation selected from the group consisting of: SMARCA

5; SMARCA 2; SMARCA 4; SMARCA 3; SMARCA 1; and
CHRA1.

In a preferred method of the invention said RNAi molecule comprises a first part
5 linked to a second part wherein said first and second parts are complementary over at
least part of their length and further wherein said first and second parts form a double
stranded region by complementary base pairing over at least part of their length.

The provision of first and second sequences which are complementary to one another
10 and which comprise at least part of the coding sequence of a gene involved in stem
cell differentiation means that when the sequence is transcribed into RNA the
complementarity between first and second sequences allows base pairing between
first and second sequences to form a double stranded RNA structure. The optional
15 provision of a linking region between first and second parts results in the formation
of a so called "hair-pin" loop structure. The transcription of the nucleic acid
provides many copies of the hair-pin loop RNA which effectively functions as a
RNAi molecule. The hair-pin loop RNA can be transcribed *in vitro* using, for
example commercially available transcription kits which utilise phage RNA
polymerase or *in vivo* using vectors adapted for expression by a cell, typically a
20 eukaryotic cell, preferably a lineage restricted stem cell or embryonic stem cell.

According to a further aspect of the invention there is provided an RNAi molecule
which comprises a sequence of a gene wherein said gene mediates stem cell
differentiation.

25 In a preferred embodiment of the invention said RNAi molecule comprises a first
part linked to a second part wherein said first and second parts are complementary
over at least part of their length and further wherein said first and second parts form a
double stranded region by complementary base pairing over at least part of their
30 length.

In a further preferred embodiment of the invention said first and second parts are linked by at least one nucleotide base. In a further preferred embodiment of the invention said first and second parts are linked by 2, 3, 4, 5, 6, 7, 8, 9, or 10 nucleotide bases. In a yet further preferred embodiment of the invention said linker is at least 10 nucleotide bases.

In a further preferred embodiment said coding sequence is an exon.

Alternatively said RNA molecule is derived from intronic sequences or the 5' and/or 3' non-coding sequences which flank coding/exon sequences of genes which modulate stem cell differentiation.

In a further preferred embodiment of the invention the length of the RNAi molecule is between 10 nucleotide bases (nb) –1000nb. More preferably still the length of the RNA molecule is selected from 10nb; 20nb; 30nb; 40nb; 50nb; 60nb; 70nb; 80nb; 90nb. More preferably still said RNA molecule is 21nb in length. Preferably said RNAi molecule comprises 19 complementary bases with a 3' 2nb overhang at either end.

In a further preferred embodiment of the invention said RNA molecule is 100nb; 200nb; 300nb; 400nb; 500nb; 600nb; 700nb; 800nb; 900nb; or 1000nb. More preferably still said RNA molecule is at least 1000nb.

In yet a further preferred embodiment of the invention said RNAi molecules comprise modified nucleotide bases.

It will be apparent to one skilled in the art that the inclusion of modified bases, as well as the naturally occurring bases cytosine, uracil, adenosine and guanosine, may confer advantageous properties on RNAi molecules containing said modified bases. For example, modified bases may increase the stability of the RNAi molecule thereby

reducing the amount required to produce a desired effect. The provision of modified bases may also provide RNAi molecules which are more or less stable.

The term "modified nucleotide base" encompasses nucleotides with a covalently modified base and/or sugar. For example, modified nucleotides include nucleotides having sugars which are covalently attached to low molecular weight organic groups other than a hydroxyl group at the 3' position and other than a phosphate group at the 5' position. Thus modified nucleotides may also include 2' substituted sugars such as 2'-O-methyl-; 2'-O-alkyl; 2'-O-allyl; 2'-S-alkyl; 2'-S-allyl; 2'-fluoro-; 2'-halo or 2'-azido-ribose, carbocyclic sugar analogues α -anomeric sugars; epimeric sugars such as arabinose, xyloses or lyxoses, pyranose sugars, furanose sugars, and sedoheptulose.

Modified nucleotides are known in the art and include by example and not by way of limitation; alkylated purines and/or pyrimidines; acylated purines and/or pyrimidines; or other heterocycles. These classes of pyrimidines and purines are known in the art and include, pseudoisocytosine; N⁴, N⁴-ethanocytosine; 8-hydroxy-N⁶-methyladenine; 4-acetylcytosine, 5-(carboxyhydroxymethyl) uracil; 5-fluorouracil; 5-bromouracil; 5-carboxymethylaminomethyl-2-thiouracil; 5-carboxymethylaminomethyl uracil; dihydrouracil; inosine; N⁶-isopentyl-adenine; 1-methyladenine; 1-methylpseudouracil; 1-methylguanine; 2,2-dimethylguanine; 2-methyladenine; 2-methylguanine; 3-methylcytosine; 5-methylcytosine; N⁶-methyladenine; 7-methylguanine; 5-methylaminomethyl uracil; 5-methoxy amino methyl-2-thiouracil; β -D-mannosylqueosine; 5-methoxycarbonylmethyluracil; 5-methoxyuracil; 2-methylthio-N⁶-isopentenyladenine; uracil-5-oxyacetic acid methyl ester; pseudouracil; 2-thiocytosine; 5-methyl-2-thiouracil, 2-thiouracil; 4-thiouracil; 5-methyluracil; N-uracil-5-oxyacetic acid methylester; uracil 5-oxyacetic acid; queosine; 2-thiocytosine; 5-propyluracil; 5-propylcytosine; 5-ethyluracil; 5-ethylcytosine; 5-butyluracil; 5-pentyluracil; 5-pentylcytosine; and 2,6-diaminopurine; methylpseudouracil; 1-methylguanine; 1-methylcytosine;

The RNAi molecules of the invention can be synthesized using conventional phosphodiester linked nucleotides and synthesized using standard solid or solution phase synthesis techniques which are known in the art. Linkages between nucleotides may use alternative linking molecules. For example, linking groups of the formula P(O)S, (thioate); P(S)S, (dithioate); P(O)NR'²; P(O)R'; P(O)OR⁶; CO; or CONR'² wherein R is H (or a salt) or alkyl (1-12C) and R⁶ is alkyl (1-9C) is joined to adjacent nucleotides through -O- or -S-.

According to a further aspect of the invention there is provided a nucleic acid molecule encoding at least part of a gene which modulates stem cell differentiation comprising a first part linked to a second part which first and second parts are complementary over at least part of their length, wherein said nucleic acid molecule is operably linked to at least one further nucleic acid molecule capable of promoting transcription of said nucleic acid linked thereto and further wherein said first and second parts form a double stranded region by complementary base pairing over at least part of their length as or when said nucleic acid molecule is transcribed.

In a preferred embodiment of the invention said first and second parts are linked by linking nucleotides as hereinbefore described.

20

It will be apparent to one skilled in the art that the synthesis of RNA molecules which form RNA stem loops can be achieved by providing vectors which include target genes, or fragments of target genes, operably linked to promoter sequences. Typically, promoter sequences are phage RNA polymerase promoters (eg T7, T3, SP6). Advantageously vectors are provided with multiple cloning sites into which genes or gene fragments can be subcloned. Typically, vectors are engineered so that phage promoters flank multiple cloning sites containing the gene of interest.

Alternatively target genes or fragments of target genes can be fused directly to phage promoters by creating chimeric promoter/gene fusions via oligo synthesising technology. Constructs thus created can be easily amplified by polymerase chain

reaction to provide templates for the manufacture of RNA molecules comprising stem loop RNA's.

5 According to a further aspect of the invention there is provided an expression vector including an expression cassette comprising at least one nucleic acid molecule encoding an RNAi molecule according to the invention.

10 Vectors including expression cassettes encoding stem-loop RNA's are adapted for eukaryotic gene expression. Typically said adaptation includes, by example and not by way of limitation, the provision of transcription control sequences (promoter sequences) which mediate cell/tissue specific expression. These promoter sequences may be cell/tissue specific, inducible or constitutive.

15 Promoter elements typically also include so called TATA box and RNA polymerase initiation selection sequences which function to select a site of transcription initiation. These sequences also bind polypeptides which function, *inter alia*, to facilitate transcription initiation selection by RNA polymerase.

20 Adaptations also include the provision of selectable markers and autonomous replication sequences which both facilitate the maintenance of said vector in either the eukaryotic cell or prokaryotic host. Vectors which are maintained autonomously are referred to as episomal vectors. Further adaptations which facilitate the expression of vector encoded genes include the provision of transcription termination sequences.

25

These adaptations are well known in the art. There is a significant amount of published literature with respect to expression vector construction and recombinant DNA techniques in general. Please see, Sambrook et al (1989) Molecular Cloning: A Laboratory Manual, Cold Spring Harbour Laboratory, Cold Spring Harbour, NY and
30 references therein; Marston, F (1987) DNA Cloning Techniques: A Practical

Approach Vol III IRL Press, Oxford UK; DNA Cloning: F M Ausubel et al, Current Protocols in Molecular Biology, John Wiley & Sons, Inc.(1994).

5 In a preferred embodiment of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a notch receptor processing factor polypeptide selected from the group consisting of: Nrarp; P300; presenilin associated protein; presenilin 1; presenilin 2; or Sel-1.

10 In an alternative preferred embodiment said RNAi molecule is derived from a nucleic acid molecule encoding a Notch target gene selected from the group consisting of: HERP1; HERP2; HES1; HES 2; HES 4; HES6, HES7, HERP1, HERP2, HESR1, HEY1, HEY2, HEYL HRT1, HRT2, HRT3 CHF1, CHF2 GRIDLOCK.

15 In a preferred embodiment of the invention said RNAi molecule is derived from a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of:

- i) a nucleic acid sequence as represented by the sequences in SEQ ID NO: 7-23, or fragment thereof;
- 20 ii) a nucleic acid sequence which hybridises to the nucleic acid sequences of SEQ ID NO: 7-23 and is a Notch signalling target gene;
- iii) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

25 In a further alternative method of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt ligand processing factor selected from the group consisting of: LRP1; LRP2; LRP3; LRP4; LRP5; LRP6; LRP8; or Porcupine.

30 In a yet further alternative method said RNAi molecule is derived from a nucleic acid molecule encoding an extracellular Wnt antagonist selected from the group consisting of: Dkk1; Dkk2; Dkk3; Dkk4; Frzb; or SARP1.

In a further preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt cytoplasmic acting component selected from the group consisting of: APC; Axin1; Axin2; FRAT1; GSK3; ICAT; IDAX; Par 1; or TAB1.

5

Alternatively, said RNAi molecule is derived from a nucleic acid molecule encoding a Wnt nuclear acting component selected from the group consisting of: β -catenin; β -TRCP; CBP; CTBP1; HBP-1; Lef1; NLK; Pontin 52; or Reptin 52.

- 10 In a yet further preferred method of the invention said RNAi molecule is derived from a nucleic acid molecule which encodes a Wnt target gene selected from ASCL 1 or ASCL 2.

- 15 In a yet still further preferred method of the invention said RNAi molecule is derived from the group consisting of: FGF 5; msx 1; neurogenin 1; neurogenin 2; neurogenin 3 ; or PTEN.

- According to a further aspect of the invention there is provided a method of treatment of an animal, preferably a human, comprising administering an effective amount of at least one RNAi molecule according to the invention, to a subject to be treated.
- 20

- According to a yet further aspect of the invention there is provided a method of treatment of an animal, preferably a human, comprising administering an effective amount of at least one vector which includes an RNAi molecule according to the invention, to a subject to be treated.
- 25

An effective amount is an amount sufficient to induce the differentiation of at least one stem cell into at least one lineage restricted stem cell or differentiated stem cell.

According to a further aspect of the invention there is provided a lineage restricted stem cell or a differentiated stem cell obtainable by the method according to the invention.

- 5 In a preferred embodiment of the invention said lineage restricted stem cell is selected from the group consisting of: haemopoietic stem cell; neural stem cell; bone stem cell; muscle stem cell; mesenchymal stem cell; trophoblastic stem cell; epithelial stem cell (derived from organs such as the skin, gastrointestinal mucosa, kidney, bladder, mammary glands, uterus, prostate and endocrine glands such as the
10 pituitary); endodermal stem cell (derived from organs such as the liver, pancreas, lung and blood vessels).

- In a further preferred embodiment of the invention said cell is selected from the group consisting of: a nerve cell; a mesenchymal cell; a muscle cell (cardiomyocyte);
15 a liver cell; a kidney cell; a blood cell (eg erythrocyte, CD4+ lymphocyte, CD8+ lymphocyte; pancreatic β cell; epithelial cell (eg lung, gastric,) ; an endothelial cell.

- According to a yet further aspect of the invention there is provided a cell culture comprising at least one lineage restricted stem cell or differentiated cell according to
20 the invention.

According to a further aspect of the invention there is provided an organ comprising a lineage restricted stem cell or a differentiated stem cell according to the invention.

- 25 According to a yet further aspect of the invention there is provided a method of treatment of an animal, preferably a human, comprising administering a cell or organ according to the invention.

- An embodiment of the invention will now be described by example only and with
30 reference to the following figures and tables wherein:

Table 1 represents the nucleic acid sequences of Notch/Wnt target genes molecules from which RNAi molecules are derived;

5 Table 2 represents nucleic acid sequences of polycomb target genes from which RNAi molecules are derived;

Table 3 represents nucleic acid sequences of enhancers of trithorax and polycomb target genes from which RNAi molecules are derived;

10 Table 4 represents nucleic acid sequences of histone deacetylase target genes from which RNAi molecules are derived;

Table 5 represents nucleic acid sequences of histone acetylase target genes from which RNAi molecules are derived;

15

Table 6 represents nucleic acid sequences of ATP dependent chromatin modification target genes from which RNAi molecules are derived;

Table 7 represents a selection of antibodies used to monitor stem cell differentiation;

20

Table 8 represents nucleic acid probes used to assess mRNA markers of stem differentiation;

Table 9 represents protein markers of stem cell differentiation;

25

Figure 1 illustrates stem cell differentiation is controlled by positive and negative regulators (A). The specific cell phenotypes that are derived are a direct result of positive and negative regulators which activate or suppress particular differentiation events. RNAi can be used to control both the initial differentiation of stem cells (A) and the ultimate fate of the differentiated cells D1 and D2 by repression of positive
30 activators which would normally promote a particular cell fate;

Figure 2 represents (A) a schematic diagram illustrating the Notch and Wnt signalling pathways. The Notch and Wnt signaling pathways are shown.

Materials and Methods

5

Cell Culture

NTERA2 and 2102Ep human EC cell lines were maintained at high cell density as previously described (Andrews et al 1982, 1984b), in DMEM (high glucose
10 formulation) (DMEM)(GIBCO BRL), supplemented with 10% v/v bovine foetal calf serum (GIBCO BRL), under a humidified atmosphere with 10% CO₂ in air.

Double stranded RNA synthesis

15 PCR primers were designed against the mRNA sequence of interest to give a product size of around 500bp. At the 5' end of each primer was added a T7 RNA polymerase promoter, comprising one or other of the following sequences: TAATACGACTCACTATAGGG; AATTATAATACGACTCACTATA. PCR was performed using these primers on an appropriate cDNA source (e.g. derived from the
20 cell type to be targeted) and the product cloned and sequenced to confirm its identity. Using the sequenced clone as a template, further PCRs were performed as required to generate template DNA for RNA synthesis. In each case, a quantity of the PCR was electrophoresed through agarose to verify product size and abundance, whilst the remainder was purified by alkaline phenol/chloroform extraction. RNA was
25 synthesized using the Megascript kit (Ambion Inc.) according to the manufacturer's protocol and acid phenol/chloroform extracted. The simultaneous synthesis of complementary strands of RNA in a single reaction circumvents the requirement for an annealing step. However, the quality and duplexing of the synthesized RNA was confirmed by agarose gel electrophoresis, with the desired products migrating as
30 expected for double stranded DNA of the same length.

Treatment of human cells with dsRNA to produce RNAi

The following method describes RNAi of cells cultured in 6 well plates. Volumes and cell numbers should be scaled appropriately for larger or smaller culture vessels.

5

Cells were seeded at 500,000 per well on the day prior to treatment and grown in their normal medium. For each well to be treated, 9.5µg of the double stranded RNA of interest was diluted in 300µl of 150mM NaCl. 21µl of ExGen 500 (MBI Fermentas) was added to the diluted RNA solution and mixed by vortexing. The dsRNA/ExGen 500 mixture was incubated at room temperature for 10 minutes. 3ml of fresh cell growth medium was then added, producing the RNAi treatment medium. Growth medium was aspirated from the culture vessel and replaced with 3ml of RNAi treatment medium per well. Culture vessels were then centrifuged at 280g for 5 minutes and returned to the incubator. After 12-18hrs, RNAi treatment medium was replaced with normal growth medium and the cells maintained as required.

15

Total RNA production

Growing cultures of cells were aspirated to remove the DME and foetal calf serum.

20

Trace amounts of foetal calf serum was removed by washing in Phosphate-buffered saline. Fresh PBS was added to the cells and the cells were dislodged from the culture vessel using acid washed glass beads. The resulting cell suspension was centrifuged at 300xg. The pellets had the PBS aspirated from them. Tri reagent (Sigma, USA) was added at 1ml per 10^7 cells and allowed to stand for 10 mins at room temperature. The lysate from this reaction was centrifuged at 12000 x g for 15 minutes at 4°C. The resulting aqueous phase was transferred to a fresh vessel and 0.5 ml of isopropanol / ml of trizol was added to precipitate the RNA. The RNA was pelleted by centrifugation at 12000 x g for 10 mins at 4°C. The supernatant was removed and the pellet washed in 70% ethanol. The washed RNA was dissolved in DEPC treated double-distilled water.

25

30

Analysis of the differentiation of EC stem cells induced by exposure to RNAi

- 5 Following exposure to RNAi corresponding to specific key regulatory genes, the subsequent differentiation of the EC cells was monitored in a variety of ways. One approach was to monitor the disappearance of typical markers of the stem cell phenotype; the other was to monitor the appearance of markers pertinent to the specific lineages induced. The relevant markers included surface antigens, mRNA
10 species and specific proteins.

Analysis of Transfectants by Antibody Staining and FACS

- Cells were treated with trypsin (0.25% v/v) for 5 mins to disaggregate the cells; they
15 were washed and re-suspended to 2×10^5 cells/ml. This cell suspension was incubated with 50 μ l of primary antibody in a 96 well plate on a rotary shaker for 1 hour at 4°C. Supernatant from a myeloma cell line P3X63Ag8, was used as a negative control. The 96 well plate was centrifuged at 100rpm for 3 minutes. The plate was washed 3 times with PBS containing 5% foetal calf serum to remove unbound antibody. Cell
20 were then incubated with 50 μ l of an appropriate FITC-conjugated secondary antibody at 4°C for 1 hour. Cells were washed 3 times in PBS + 5% foetal calf serum and analysed using an EPICS elite ESP flow cytometer (Coulter electronics, U.K.).(Andrews et. al., 1982)

25 Northern blot Analysis of RNA

- RNA separation relies on the generally the same principles as standard DNA but with some concessions to the tendency of RNA to hybridise with itself or other RNA molecules. Formaldehyde is used in the gel matrix to react with the amine groups of the RNA and form Schiff bases. Purified RNA is run out using standard agarose gel
30 electrophoresis. For most RNA a 1% agarose gel is sufficient. The agarose is made in 1X MOPS buffer and supplemented with 0.66M formaldehyde. Dried down RNA samples are reconstituted and denatured in RNA loading buffer and loaded into the

gel. Gels are run out for apprx. 3 hrs (until the dye front is 3/4 of the way down the gel).

5 The major problem with obtaining clean blotting using RNA is the presence of formaldehyde. The run out gel was soaked in distilled water for 20 mins with 4 changes, to remove the formaldehyde from the matrix. The transfer assembly was assembled in exactly the same fashion as for DNA (Southern) blotting. The transfer buffer used however was 10X SSPE. Gels were transfered overnight. The membrane was soaked in 2X SSPE to remove any agarose from the transfer assembly and the
10 RNA was fixed to the memebrane. Fixation was acheived using short-wave (254 nM) UV light. The fixed membrane was baked for 1-2 hrs to drive off any residual formaldehyde.

15 Hybridisation was acheived in aqueous phase with formamide to lower the hybridisation temperatures for a given probe. RNA blots were prehybridised for 2-4 hrs in northern prehybridisation sololution. Labelled DNA probes were denatured at 95°C for 5 mins and added to the blots. All hybridisation steps were carried out in rolling bottles in incubation ovens. Probes were hybridised overnight for at least 16 hrs in the prehybridisation sololution. A standard set of wash sololutions were used.
20 Stringency of washing was acheived by the use of lower salt containing wash buffers. The following wash procedure is outlined as follows

	2X SSPE	15 mins	room temp
	2X SSPE	15 mins	room temp
	2X SSPE/ 0.1% SDS	45 mins	65°C
25	2X SSPE/ 0.1% SDS	45 mins	65°C
	0.1X SSPE	15 mins	room temp

Preparation of radiolabelled DNA probes

30 The method of Feinberg and Vogelstein (Feinberg and Vogelstein, 1983) was used to radioactively label DNA. Briefly, the protocol uses random sequence hexanucleotides to prime DNA synthesis at numerous sites on a denatured DNA template using the

Klenow DNA polymerase I fragment. Pre-formed kits were used to aid consistency .
5-100ng DNA fragment (obtained from gel purification of PCR or restriction digests)
was made up in water,denatured for 5 mins at 95°C with the random hexamers. The
mixture was quench cooled on ice and the following were added,

5 5 µl [α -32P] dATP 3000 Ci/mmol

1 µl of Klenow DNA polymerase (4U)

The reaction was then incubated at 37°C for 1 hr. Unincorporated nucleotide were
removed with spin columns (Nucleon Biosciences).

10 Production of cDNA

The enzymatic conversion of RNA into single stranded cDNA was achieved using
the 3' to 5' polymerase activity of recombinant Moloney-Murine Leukemia Virus
(M-MLV) reverse transcriptase primed with oligo (dT) and (dN) primers. For

15 Reverse Transcription-Polymerase Chain Reaction, single stranded cDNA was used.

cDNA was synthesised from 1µg poly (A)+ RNA or total RNA was incubated with
the following

1.0µM oligo(dT) primer for total RNA or random hexcamers for mRNA

0.5mM 10mM dNTP mix

20 1U/µl RNase inhibitor (Promega)

1.0U/µl M-MLV reverse transcriptase in manufacturers supplied buffer
(Promega)

The reaction was incubated for 2-3 hours at 42°C

25 Fluorescent Automated Sequencing

To check the specificity of the PCR primers used to generate the template used in
RNAi production automatic sequencing was carried out using the prism fluorescently
labelled chain terminator sequencing kit (Perkin-Elmer) (Prober et al 1987). A

30 suitable amount of template (200ng plasmid, 100ng PCR product), 10 µM
sequencing primer (typically a 20mer with 50% G-C content) were added to 8 µl of

prism pre-mix and the total reaction volume made up to 20 µl. 24 cycles of PCR (94°C for 10 seconds, 50°C for 10 seconds, 60°C for 4 minutes). Following thermal cycling, products were precipitated by the addition of 2µl of 3M sodium acetate and 50 µl of 100 % ethanol. DNA was pelleted in an Eppendorf microcentrifuge at 13000 rpm, washed once in 70% ethanol and vacuum dried. Samples were analysed by the in-house sequencing Service (Krebs Institute). Dried down samples were resuspended in 4 µl of formamide loading buffer, denatured and loaded onto a ABI 373 automatic sequencer. Raw sequence was collected and analysed using the ABI prism software and the results were supplied in the form of analysed histogram traces.

Detection of specific protein targets by SDS-PAGE and Western Blotting

To obtain cell lysates monolayers of cells were rinsed 3 times with ice-cold PBS supplemented with 2 mM CaCl₂. Cells were incubated with 1 ml/75 cm² flask lysis buffer (1% v/v NP40, 1% v/v DOC, 0.1 mM PMSF in PBS) for 15 min at 4°C. Cell lysates were transferred to eppendorf tubes and passed through a 21 gauge needle to shear the DNA. This was followed by freeze thawing and subsequent centrifugation (30 min, 4°C, 15000g) to remove insoluble material. Protein concentrations of the supernatants were determined using a commercial protein assay (Biorad) and were adjusted to 1.3 mg/ml. Samples were prepared for SDS-PAGE by adding 4 times Laemmli electrophoresis sample buffer and boiling for 5 min. After electrophoresis with 16 µg of protein on a 10% polyacrylamide gel (Laemmli, 1970) the proteins were transferred to nitro-cellulose membrane with a pore size of 0.45µm. The blots were washed with PBS and 0.05% Tween (PBS-T). Blocking of the blots occurred in 5% milk powder in PBS-T (60 min, at RT). Blots were incubated with the appropriate primary antibody. Horseradish peroxidase labelled secondary antibody was used to visualise antibody binding by ECL (Amersham, Bucks., UK). Materials used for SDS-PAGE and western blotting were obtained from Biorad (California, USA) unless stated otherwise.

Table7: Antibodies used to detect stem cell differentiation

Antibody	Class	Species	Cell phenotype detected	Changes on Differentiation	Reference
TRA-1-60	IgM	Mouse	Human EC, ES cells.	↓ differentiation	Andrews et.al., 1984a
TRA-1-81	IgM	Mouse	Human EC, ES cells.	↓ differentiation	Andrews et. al., 1984a
SSEA3	IgM	Rat	Human EC, ES cells.	↓ differentiation	Shevinsky et al 1982, Fenderson et al 1987
SSEA4	IgG	Mouse	Human EC, ES cells.	↓ differentiation	Kannagi et al 1983 Fenderson et al 1987
A2B5	IgM	Mouse		↑ differentiation	Fenderson et al 1987
ME311	IgG	Mouse		↑ differentiation	Fenderson et al 1987
VIN-IS-56	IgM	Mouse		↑ differentiation	Andrews et al 1990
VIN-IS-53	IgG	Mouse		↑ differentiation	Andrews et al 1990

5 Table 8: Probes used to assess mRNA markers of differentiation

Gene	Cell Type
Synaptophysin	Neuron
NeuroD1	Neuron
MyoD1	Muscle
Collagens	Cartilage
Alpha-actin	Skeletal muscle
Smooth-muscle actin	Smooth muscle

Table 9: Protein markers of differentiation, detected by Western Blot and/or immunofluorescence.

- 5 The following antibodies were detected by the appropriate commercially available antibodies

Cell Type	Antigen
Neurons	Neurofilaments
Glial cells	GFAP
Epithelial cells	Cytokeratins
Mesenchymal cells	Vimentin
Muscle	Desmin
Muscle	Tissue specific actins
Connective tissue cells	Collagens

10

15

20

References

- Andrews P.W., Goodfellow P.N., Shevinsky L., Bronson D. L. and Knowles B.B. 1982. Cell surface antigens of a clonal human embryonal carcinoma cell line: Morphological and antigenic differentiation in culture. *Int. J. Cancer*. 29: 523-531.
- Andrews P.W., Banting G.S., Damjanov I., Arnaud D. and Avner P. 1984a. Three monoclonal antibodies defining distinct differentiation antigens associated with different high molecular weight polypeptides on the surface of human embryonal carcinoma cells. *Hybridoma*. 3: 347-361.
- Andrews P.W., Damjanov I., Simon D., Banting G., Carlin C., Dracopoli N.C. and Fogh J. 1984b. Pluripotent embryonal carcinoma clones derived from the human teratocarcinoma cell line Tera-2: Differentiation *in vivo* and *in vitro*. *Lab. Invest*. 50: 147-162.
- Andrews P.W., Nudelman E., Hakomori S. -i. and Fenderson B.A. 1990. Different patterns of glycolipid antigens are expressed following differentiation of TERA-2 human embryonal carcinoma cells induced by retinoic acid, hexamethylene bisacetamide (HMBA) or bromodeoxyuridine (BUdR). *Differentiation*. 43: 131-138.
- Fenderson B.A., Andrews P.W., Nudelman E., Clausen H. and Hakomori S.-i. 1987. Glycolipid core structure switching from globo- to lacto- and ganglio-series during retinoic acid-induced differentiation of TERA-2-derived human embryonal carcinoma cells. *Dev. Biol*. 122: 21-34.
- Kannagi, R., Levery, S.B., Ishigami, F., Hakomori, S., Shevinsky, L.H., Knowles, B.B. and Solter, D. (1983) New globoseries glycosphingolipids in human teratocarcinoma reactive with the monoclonal antibody directed to a developmentally regulated antigen, stage-specific embryonic antigen 3. *J. Biol. Chem*. 258, 8934-8942.

Shevinsky, L.H., Knowles, B.B., Damjanov, I. and Solter, D. (1982) Monoclonal antibody to murine embryos defines a stage-specific embryonic antigen expressed on mouse embryos and human teratocarcinoma cells. *Cell* 30, 697-705.

- 5 Solter, D. and Knowles, B.B. (1978) Monoclonal antibody defining a stage-specific mouse embryonic antigen (SSEA-1). *Proc. natl. Acad. Sci. USA* 75, 5565-5569.

Recent progress in identifying genes regulating hematopoietic stem cell function and fate Craig T Jordan, Gary Van Zant *Current Opinion in Cell Biology* 1998, 10:716-720.

10

Singer MJ, Selker EU. Genetic and epigenetic inactivation of repetitive sequences in *Neurospora crassa*: RIP, DNA methylation, and quelling. *Curr Top Microbiol Immunol.* 1995;197:165-77.

- 15 Matzke MA, Matzke AJ. Gene silencing in plants: relevance for genome evolution and the acquisition of genomic methylation patterns. *Novartis Found Symp.* 1998;214:168-80; discussion 181-6. Review.

Stam M, de Bruin R, van Blokland R, van der Hoorn RA, Mol JN, Kooter JM. Distinct features of post-transcriptional gene silencing by antisense transgenes in single copy and inverted T-DNA repeat loci. *Plant J.* 2000 Jan;21(1):27-42.

- 20 Montgomery MK, Xu S, Fire A. RNA as a target of double-stranded RNA-mediated genetic interference in *Caenorhabditis elegans*. *Proc Natl Acad Sci U S A.* 1998 Dec 22;95(26):15502-7.

Fire A, Xu S, Montgomery MK, Kostas SA, Driver SE, Mello CC. Potent and specific genetic interference by double-stranded RNA in *Caenorhabditis elegans*.

- 25 *Nature.* 1998 Feb 19;391(6669):806-11

Kennerdell JR, Carthew RW. Heritable gene silencing in *Drosophila* using double-stranded RNA. *Nat Biotechnol.* 2000 Aug;18(8):896-898.

Shi H, Djikeng A, Mark T, Wirtz E, Tschudi C, Ullu E. Genetic interference in *Trypanosoma brucei* by heritable and inducible double-stranded RNA. *RNA*. 2000 Jul;6(7):1069-76.

- 5 Wianny F, Zernicka-Goetz M. Specific interference with gene function by double-stranded RNA in early mouse development. *Nat Cell Biol*. 2000 Feb;2(2):70-5

- Thomson JA, Itskovitz-Eldor J, Shapiro SS, Waknitz MA, Swiergiel JJ, Marshall VS, Jones JM. Embryonic stem cell lines derived from human blastocysts. *Science*.
10 1998 Nov 6;282(5391):1145-7.

Thomson JA, Kalishman J, Golos TG, Durning M, Harris CP, Becker RA, Hearn JP. Isolation of a primate embryonic stem cell line. *Proc Natl Acad Sci U S A*. 1995 Aug 15;92(17):7844-8.

15

Prober JM, Trainor GL, Dam RJ, Hobbs FW, Robertson CW, Zagursky RJ, Cocuzza AJ, Jensen MA, Baumeister K. A system for rapid DNA sequencing with fluorescent chain-terminating dideoxynucleotides. *Science*. 1987 Oct 16;238(4825):336-41.

20

Feinberg AP, Vogelstein B. A technique for radiolabeling DNA restriction endonuclease fragments to high specific activity. *Anal Biochem*. 1983 Jul 1;132(1):6-13.

- 25 Mullis KB, Faloona FA. Specific synthesis of DNA in vitro via a polymerase-catalyzed chain reaction. *Methods Enzymol*. 1987;155:335-50.

- Scholer HR, Hatzopoulos AK, Balling R, Suzuki N, Gruss P. A family of octamer-specific proteins present during mouse embryogenesis: evidence for germline-specific expression of an Oct factor. *EMBO J*. 1989 Sep;8(9):2543-50.
30

Kraft HJ, Mosselman S, Smits HA, Hohenstein P, Piek E, Chen Q, Artzt K, van Zoelen EJ. Oct-4 regulates alternative platelet-derived growth factor alpha receptor gene promoter in human embryonal carcinoma cells. J Biol Chem. 1996 May

5 31;271(22):12873-8.

Reubinoff BE, Pera MF, Fong CY, Trounson A, Bongso A. Embryonic stem cell lines from human blastocysts: somatic differentiation in vitro. Nat Biotechnol. 2000 Apr;18(4):399-404.

10

Shamblott MJ, Axelman J, Wang S, Bugg EM, Littlefield JW, Donovan PJ, Blumenthal PD, Huggins GR, Gearhart JD. Derivation of pluripotent stem cells from cultured human primordial germ cells. Proc Natl Acad Sci U S A. 1998 Nov 10;95(23):13726-31.

15

Clarke DL, Johansson CB, Wilbertz J, Veress B, Nilsson E, Karlstrom H, Lendahl U, Frisen J. Generalized potential of adult neural stem cells. Science. 2000 Jun 2;288(5471):1660.

20

25

30

Table 1**Notch receptor processing factors:**

DEFINITION AL527440 LTI NFL003 NBC3 Homo sapiens Nrarp 5

Prime,partial mRNA sequence.

ACCESSION AL527440 SEQ ID NO: 1

Gaggcgcttgggaccgctgggagccgagccgaaccgagtagggaccgggaccgcgcgccgcccgtccccg
 gccggggccggcccccgcgagccgagcgcgccccgtgccaccggggcgcggtggatggcggggggtcccc
 gcggcgccgacccccgccccgagcgcccgagcgcccgagggcggtgcggggccggggacgcccgcgccts
 tbgtgcgccgagcgcgccccgagacagccggggggcccgccgcagccgcccgcgctgagccccggccgg
 cccgcggcccgccccggcgagcagntgagccagccgagctgtccacctgctccgcgccgagacgcagcgcatctt
 ccaggaggctgtgcgnagggaacacgcaggagctgcagtygctgtgcagaacatgaccaactgcgagttcaacgtg
 aactcgttcggggccgagggccagacggcgctgcaccagtcggtcatcgtcggaacctggtgctcgtgaagctgctggt
 caagttcggcgccgacatccgctggccaaccgcgacggctggagcgcgctgcamatcgccgctcgtggtggccacca
 ggacatcgtgcttatctcatcaccaaggcgaagtacgcgccagcgcsgggtatgcccgccgggacccccggacccccg
 gccctgcgcccgctcgtctgtgtacctcccgccaactacctcggtgcgcgcmcggtcgcagggccccgccagaa
 ggcccgtggcaacggcggaatacggcgctgcgtcmcgccccagggtc

DEFINITION Homo sapiens E1A binding protein p300 (EP300), mRNA.

ACCESSION NM 001429 SEQ ID NO: 2

Ccttgtttgtgtgtaggctggggggagagagggcgagagagagcgggcgagagtgggcaagcaggacgccgggt
 gagtgttaactcgggacgcagagagtgaggaggggagtcgggtcggagagagggcgagggggccagaacagtggc
 agggggcccgggggcgacgggctgaggcgacccccagccccctccgtccgcacacacccccaccgcggtccagca
 gccggggccggcgtagcgctaggggggaccattacataacccgcgcccgccgtcttctcccgccgcccggcgccc
 gaactgagccccggggcgggcgctccagcactggcccgccggcggtggggcgtagcagcgccgtattattattcgcggaa
 aggaaggcgaaggaggggagcgccggcgagggagggggccgctgcgcccgccggagcgggggcctcctcggt
 gggctccgcgtcggcgccggcggtgcggggcgcgctgctcggccccggccccctcgggccctctggtccggccagctccgc
 tccggcgctccttgccgcgctccgcccggccgcccgcgatgtgaggcgggcgccagcctgggtctcgggtcgggc
 gagtctctgcggccattagggggcggtgcggcgccggcgccggagcgccggcgaggaggaggggtcggagggtggg
 ggcgagggccggggagggggcaccgggagggaggtgagtgtcttctcctcctcctcccccttttgcggccgccc
 tcttgtggcgatgagaaggagggagacagcgccgaggaggaagaggttgatggcgggcgggagctccgagagacc
 tcggctgggcagggggccggcggtggcgggcggggactgcgctctagagccgcgagttctcgggaattcgccgagc
 ggaccggcctcggcgaatttgctcttgccctcctccgggcttgggccaggccggccccctcgacttgccttacctttt
 ctatcgagtcgcacccctctccagccactgcgacccggcggaagagaaaaaggaacttccccacccccctcggtgccgt
 cggagccccccagccccccccctgggtgcggcgccggggacccccggccgaagaagagatttctgaggattctggtttc
 ctgcttgtatctccgaaagaattaaaaatggccgagaatgtggtggaaccggggcccgccctcagccaagcgccctaaact
 ctcattccggccctctcggcgctccgcccagcgatggcacagattttggctctctatttgacttgagacacgactaccagatg
 aattaatcaactctacagaattgggactaaccaatgggtggtgatattaatcagcttcagacaagtcttggcatggtacaagatg
 cagcttctaataacataaacagctgtcagaattgctgcgatctggtagttccctaacctcaatatgggagttggtggccaggt
 caagtcagtgccagccaggcccaacagagcagtcctggattaggttgataaatagcatggtcaaaagcccaatgacacag
 gcaggcttgacttctcccaacatggggatgggcactagtggacaaaatcagggtcctacgcagtaaacaggatgatgaac
 agtcagtaaatcagcctgccatgggaatgaacacaggacgaatgcgggcatgaatcctggaatgttggtgcaggcaa
 tggacaagggataatgcctaataagtcagacggttcaattggagcagggcgaggcgacaggatatgagtaaccaa
 acccaggcatgggaagtgtggcaacttactgactgagcctctcagcaggggtctccccagatgggaggacaaacagga

ttgagaggccccagcctcttaagatgggaatgatgaacaaccccaatccttatgggtcacatatactcagaatcctggaca
gcagattggagccagtgcccttggtctccagattcagacaaaaactgtactatcaataacttatctccatttgctatggacaa
aaaggcagttcctgggtggaggaatgccaacatgggtcaacagccagccccgcaggtccagcagccaggtctggtgact
ccagttgccaaggatgggttctggagcacatagctgatccagagaagcgaagctcatccagcagcagcttggtctc
ctttgcatgctcacaagtggcagcgccgggaacaggccaatggggaagtgggcagtgcaaccttccccactgtcgcac
aatgaagaatgtcctaaaccacatgacacactgccagtcaggcaagcttggcaagtggcacactgtgcatcttctcgacaa
atcatttcacactggaagaattgtacaagacatgattgtctgtgtctccccctcaaaaatgtggtgataagagaaatcaa
cagccaatttgactggagcaccggtggacttggaaatcctagctcttaggggtgggtcaacagctgcccccaacctaa
gcactgttagtcagattgatccagctccatagaaagagcctatgcagctcttgactaccctatcaagtaaatcagatgccg
acacaacccaggtgcaagcaagaaccagcagaatcagcagcctgggcagctcccccaaggcatgcggcccatgagc
aacatgagtgctagtcctatgggagtaaatggaggtgtaggagttcaaacgccgagcttcttctgactcaatgttgattca
gccataaattctcaaaacccaatgatgagtgaatgccagtggtccctccctgggtcctatgccaacagcagctcaacct
ccactactggaattcggaacagtggtcacgaagatattactcaggaatcttcaaatcatctgttcacaaactcgtccaagcc
atatttctacgccggtatcctgctgtttaaagacagacggatggaaaacctagttgcatatgctcggaagtgaagggg
acatgtatgaatctgcaacaatcgagcgggaatactaccaccttctagctgagaaaatctataagatccagaaagaactaga
agaaaaacgaaggaccagactacagaagcagaacatgctaccaaagctgcaggcatggttccagttccatgaatccag
ggcctaacatgggacagccgcaaccaggaatgacttctaattggccctctacctgaccaagtatgatccgtggcagtggtc
caaaccagatgatgcctcgaataactccacaatctggttgaatcaattggccagatgagcatggccagccccctattgta
ccccggcaaacccctccttctcagcaccatggacagttgggtcaacctggagcttcaacccgcctatgggctatgggcct
cgtatgcaacagccttccaaccagggccagttccttctcagactcagttccatcacagggaatgaatgaacaaatccc
tttggctccgtccagcgggtcaagctccagtgctcaagcacaatgtctagtcttctcctgggtgaactctctataatgcct
ccagggtctcaggggagccacattcactgtccccagcttctcaaccagcttctcatcagaattcacctcgcctgtacctag
tcgtacccccaccctcaccatactcccccaagcataggggtcagcagccaccagcaacaacaattccagcccctgttcc
tacaccaccagccatgccacctgggcccagctccaggtctcatatccccctccaaggcagacacctacaccaccaacaa
cacaacttccccacaagtgcagccttacttctgctgcaccttctgctgaccagccccagcagcagcctcgtcacagca
gagcacagcagcgtctgttctaccccaaacgcaccgctgcttctccgcagcctgcaactccacttccagccagctgta
agcattgaaggacaggtatcaaatcctcatctactagtagcacagaagtgaattctcaggccattgctgagaagcagccttc
ccaggaagtgaagatggaggccaaaatggagtgatcaaccagaaccagcagatagcagccggaggatattcaga
gtctaaagtgaagactgtaaatggaatctaccgaacagaagagagaagcactgagttaaaaactgaaataaaagagg
aggaagaccagccaagtactcagctacccagtcactcctgggtccaggacagtcaaaagaaaaagatttcaaacagaag
aactacgacagggcactgatccaacattggaggcactttaccgtcaggatccagaatcccttcccttctgcaacctgtggac
cctcagcttttaggaatccctgattactttagattgtgaagagccccatggatcttctaccattaagagggaagttagacactg
gacagtatcaggagccctggcagtatgtgatatttggttatgttcaataatgcctggttatataaccggaaaacatcac
gggtatacaataactgctccaagctctctgaggtcttgaacaagaaatgaccagtgatgcaagccttggatactgtgtg
gcagaaagtggagttctctccacagacactgtgtgtctacggcaacagttgtgcacaatactcgtgatgccacttattaca
gttaccagaacaggtatcattctgtgagaagtgttcaatgagatccaaggggagagcgttcttgggggatgaccttccc
agcctcaaaactacaataataaagaacaatttccaagagaaaaaatgacacactggatcctgaactgttgtgtaattgata
gagtgcggaagaaagatgcatcagatctgtgtccttaccatgagatcatctggcctgctggattcgtctgtgatggctgtta
aagaaaagtgcacgaactaggaaagaaaataagtttctgctaaaaggttgccatctaccagacttggcaccttcttagagaa
tctgtgtgaatgacttctgagggcagagaatcaccctgagtcaggagaggtcactgttagagtagttcatgcttctgacaaaa
ccgtggaagtaaaaccaggcatgaaagcaaggttgggacagtgagagatggcagaatccttccataccgaacaaaa
gccccttctgcttgaagaaattgatgtgtgacctgtgcttcttggcatgcatgttcaagagatggctctgactgccctcc
acccaaccagaggagagtatacatcttacctgtagtgttcttcttccgtcctaataatgcttgaggactgcagctatcat
gaaatcctaattggaatttagaatatgtcaagaaattaggttacacaacagggcatatttgggcatgtccaccaagtgggg
agatgattatcttccattgccatcctcctgaccagaagatacccaagcccaagcgactgcaggaatggtacaaaaaatg
cttgacaaggctgtatcagagcgtattgtccatgactacaaggatattttaacaagctactgaagatagattaacaagtga
aaggaattgccttatttcgaggggtgatttctggcccaatgttctggaagaaagcattaaggaactggaacaggaggaagaa

agagaaaacgagagggaaaacaccagcaatgaaagcacagatgtgaccaagggagacagcaaaaatgctaaaaagaag
 aataataagaaaaccagcaaaaataagagcagcctgagtaggggcaacaagaagaaccgggatgccaatgtatcta
 acgacctctcacagaaactatatgccacatggagaagcataaagaggtcttcttctgtatccgctcatgtggtgctg
 gccaaactcctgctccctggtgatcctctcatcccctgcgatctgatggatggcgggatgcgtttctcacgctgg
 caagggacaagcacctggagttctcttactccgaagagcccagtggtccaccatgtgcatgctggaggagctgcacacgc
 agagccaggaccgcttctacacctgcaatgaatgcaagcaccatgtggagacacgctggcactgactgctgtgagg
 attatgacttgtgtatcacctgctataacactaaaaacatgaccacaaaatggagaaactaggccttggcttagatgatgaga
 gcaacaaccagcaggtcgcagccaccagagcccaggcgattctcgcgcctgagtatccagcgtgcatccagctctctg
 gtccatgcttgccagtgctggaatgccaattgtcactgccatcctgccagaagatgaagcgggttgagcagataccaagg
 gtgcaaacggaaaaccaatggcgggtgccccatctgcaagcagctcattgccctctgctgctaccatgccaaagcactgcc
 aggagaacaaatgcccgggtgccgttctgcttaacatcaagcagaagctccggcagcaacagctgcagcaccgactaca
 gcaggcccaaatgcttcgcaggaggatggccagcatgcagcggactgggtgtggtgggcagcaacaggggcctcccttc
 cccactcctgccactccaacgacaccaactggccaacagccaaccaccccgcagacgccccagcccacttctcagcctc
 agcctaccctcccaatagcatgccaccctacttgcccaggactcaagctgctggccctgtgtcccagggttaaggcagcag
 gccaggtgacccctccaacccctcctcagactgctcagccacccctccaggggccccacctacagcagtggaatggca
 atgcagattcagagagcagcggagacgcagcgcagatggcccacgtgcaaattttcaaaggccaatccaaccagat
 gccccgatgactccatggccccatgggtatgaaccacctcccatgaccagaggtcccagtgggcatttggagccag
 ggatgggaccgacagggatgcagcaacagccacccctggagccaaggaggattgcctcagccccagcaactacagtctg
 ggatgccaaaggccagccatgatgtcagtgcccagcatggtcaaccttgaacatggctccacaaccaggattgggccag
 gtaggtatcagcccactcaaacaggcactgtgtctcaacaagccttacaaaacctttgaggactctcaggtctccagctc
 tccctgcagcagcaacaggtgcttagtatccttcacgccaacccccagctgttggctgcattcatcaagcagcgggtgcc
 aagtatgcaactetaatccacaacccatccctgggcagcctggcatgcccaggggcagccagggtacagccacctac
 catgccaggtcagcaggggtccactccaatccagccatgcagaacatgaatccaatgcaggcggggttcagaggggt
 ggctgccccagcagcaaccacagcagcaactccagccacccatgggagggatgagccccagggtcagcagatgaa
 catgaaccacaacacatgccttcacaattccgagacatcttgagacgacagcaaatgatgcaacagcagcagcaacagg
 gagcagggccaggaataggccctggaatggccaaccataaccagttccagcaaccccaaggagttggctaccaccaca
 gccgcagcagcggatgcagcatcacatgaacagatgaacaaggaaatatgggacagataggccagcttcccaggc
 ctgggagcagaggcaggtgccagctacaggcctatcagcagcgactcctcagcaacagatggggtccctgttcagc
 ccaaccccatgagccccagcagcatatgtctccaaatcaggcccagtcacacactacaaggccagcagatcccta
 tctctccaatcaagtgcgctctcccagcctgtcccttctccacggccacagtcacagccccccactccagctctcccc
 aaggatgcagcctcagccttctccacaccacgttccccacagacaagtccccacatcctggactggtagctgccaggc
 caaccccatggaacaagggtcatttgcagcccggaccagaattcaatgcttctcagcttctagcaatccaggcatggca
 aacctccatggtgcaagcgccacggacctgggactcagcaccgataactcagactgaattcaaacctctcacagagtaca
 ctgacatacactagagacacctgtatttgggagcaaaaaattatttcttaacaagacttttctactgaaaacaattttt
 tgaatcttctgtagcctaaaagacaatttcttggaaacacataagaactgtgtagtagccgttgggttaaagcaaacatgc
 aagatgaacctgagggtgatagaatacaagaatatatttggatgggtggttaccaccagccttctcccttgtgtgt
 gtggtcaagtgtgactgggaggaggctgaggcctgtgaagccaacaatatgctcctgccttgccactccaatagggttta
 ttatttttttaataatgaacatatgtaataatgaacatatgtaataatgattatttactggtgcagatggtgacattt
 tccctatttctcactttatggaagagttaaaacatttctaaaccagaggacaaaagggttaattgtactttgaaattacattct
 atatatataataatata
 aaaaa

DEFINITION Homo sapiens presenilin-associated protein mRNA, complete cds.

ACCESSION AF189289 SEQ ID NO: 3

Cggtgccgcggggatggcgggagccggagctggagccggagctcgcggcggagcggcggcgggggtcgaggctcg
 agctcgcgatccaccgcccgcgcaccgcgcacatcctcgcacccctcggcctcgggctcagccctcggcccgcaggatg

gatggcgggtcagggggcctggggctggggacaacgccccgaccactgaggctctttcgtggcactgggcgcgggc
gtgacggcgctcagccatcccctgctctacgtgaagctgctcatcagggtgggtcatgagccgatgccccccaccctggg
accaatgtgctggggaggaaggtcctctatctgccgagcttctcacctacgccaagtacatcgtgcaagtggatgtaaga
tagggctgttccgaggcctgagtcctccggctgatgtccaacgccccctctactgtgactcggggtagcatgaagaaggttt
ccctccagatgagattgagcaggttccaacaaggatgataigaagacttccctgaagaaagttgtgaaggagacctcctac
gagatgatgatgcagtgtgtgtcccgcagtgtggcccacccctgcatgtcatctcaatgcgctgcatgggtccagttgtggg
acgggaggccaagtacagtggtgtgtgagctccattgggaagatttcaaagaggaaagggtgctgggattcttctgttga
ttaatccctcacctcctgggcgatgtgtgtttctgtggggctgtaacctgctggcccacttcatcaatgcctacctgggtgatg
acagcgtgagtgacacccaggggggctgggaaacgaccagaatccaggttccagttcagccaggccctggccatcc
ggagctataccaagtctgtgatggggattgcagtgcagcatgtgacctaccccttctgctagtggcgacctcatggctgtg
aacaactgcgggctgcaagctgggctcccccttactccccagtggtcaaatcctggattactgctggaagtacctgagtg
gcagggccagctcttccgaggctccagcctgctttccgcccgggtgtcatcaggatcatgctttgccctggagtaacctgaat
catctaaaaaacacgggtctcaacctggccaccgtgggtgaggcctgaccacctgggacacctgcaagacgactccaacc
caacaacaaccagatgtgctccagcccagccgggttcagttccatattgccatgtgtctgtccagatgtgggggtgagcg
gggggtggggtgcacccagtgattgggtcaccggcagacctagggaaaggtgaggcgaggtggggaggtggcagaat
ccccatactcgcagattgtgagtgctgtgtgtgagagggccagagaatggcttatggggggccaggttgatgggga
aaggctaattggggtcagacccaccccgcttaccctccagtcagccagcgccatcctgcagctcagctgggagcatc
attctcctgctttgtacataggggtgtgtccctggcacgtggccaccatcatgtctaggcctatgctaggaggcaaatggc
agctctgctgtgttttctcaacactactttctgatatgagggcagcacctgcctctgaatgggaaatcatgcaactactcag
aatgtgtcctcctcatctaatgtcatctgtttaatggtgatgcctcgcgtacaggatctggttacctgtgcagttgtgaataccc
agaggttgggcagatcagtgctctatgctcctaccagttttaaagttcatggaagattgacctcatctcccgaaataaatgt
attggtgatttggaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

DEFINITION Homo sapiens presenilin 1 (PSEN1) mRNA, complete cds.

ACCESSION AF416717 SEQ ID NO: 4

Atgacagagttacctgcaccgtgtcctacttccagaatgcacagatgtctgaggacaaccacctgagcaatactgtacgta
gccagaatgacaatagagaacggcaggagcacaacgacagacggagccttggccaccctgagccattatctaattggacg
acccagggtaactcccggcagggtggtggagcaagatgaggaagaagatgaggagctgacattgaaatatggcgccaag
catgtgatcatgctttgtccctgtgactctctgcatggtgggtgctggtaccattaagtacgtcagctttataccggaa
ggatgggcagctaatctataccccattcacagaagataccgagactgtgggccaggagccctgcactcaattctgaatgc
tgccatcatgatcagtgctattgtgtcatgactatcctcctggtggttctgtataaatacaggtgctataaggtcatccatgcct
ggcttattatcatctctattgtgtgttctttttcattcatttacttgggggaagtgtttaaaccctataacgttgcgtggacta
cattactgttgactcctgatctggaatttgggtgtggtgggaatgatttccattcactggaaaggtccacttcgactccagcag
gcatactcattatgattagtgccctcatggccctggtgtttatcaagtacccctgaatggactgcgtggctcatcttggtgt
gatttcgggtatatgattagtggtgtgtgtccgaaagggtccacttcgtatgctggttgaacagctcaggagagaaatgaa
acgctttttcagctctcatttactcctcaacaatggtgtggttgggtgaatatggcagaaggagaccgggaagctcaaggag
agtatccaaaaattcgaagtataatgcagaaagagcctgtctgctcctgctgccatcaacctgctgtctatagctccatggc
accaggtgttcatgccaaagggtgcctgcaggccacggcacagaaggagtcacaagacactgttgcagagaatg
atgatggcgggtcagtgaggaatgggaagcccagaggggacagtcactataggccctcatcgctctacacctgagtcacga
gctgctgtccaggaacttccagcagtatcctcgtgtgaagaccagaggaaaggaggtaaaacttgattgggagat
ttcatt

DEFINITION Homo sapiens presenilin 2 (Alzheimer disease 4) (PSEN2), transcript
variant 1, mRNA.

ACCESSION NM_000447 SEQ ID NO: 5

Cgagcggcgggcgagcaggcatttccagcagtgaggagacagccagaagcaagctattggagctgaaggaaacctgag
acagaagctagtccccctctgaatttactgatgaagaaactgaggccacagagctaaagtactttccaaggctcggcc
agcgaggacgtgggacttctcagacgtcaggagagtgtgtgagggagctgtgtgaccatagaaagtacgtgttaaaaa
ccagcgtgccctcttgaagccaggagcatcatteatttagcctgctgagaagaagaacaaagtgtccgggattcag

accctctcgccgccccaaagtgttcgtggtgcttccagaggcagggtatgctcacattcatggcctctgacagcgaggaaga
 agtgtgtgatgagcggacgtccctaatgtcggccgagagccccacgccgcgtcctgccaggaggcaggcaggccccc
 agaggatggagagaacactgccagtgagagaagccaggagaacgaggaggacggtgaggaggacctgaccgctatg
 tctgtagtgggttccccggcggccgcccaggcctggaggaagagctgacctcaaatacggagcgaagcacgtgatcat
 gctgtttgtgcctgtcactctgtgcatgacgtggtggttagccaccatcaagtctgtgcgttctacacagagaagaatggac
 agctcatctacacgacattcactgaggacacaccctcggtggccagcgcctcctcaactccgtgctgaacaccctcatcat
 gatcagcgtcatcgtggtatgaccatcttctggtggtgctctacaagtaccgctgctacaagttcatccatggctggtgatc
 atgtcttactgatgctgctgttctcttccactatactaccttggggaaagtgtcaagacctacaatgtggccatggactacc
 ccaccctcttctgactgtctggaacttcggggcagtgggcatggtgtgcatccactggaaggccctctggtgctgcagca
 ggcctacctcatcatgatcagtcgctcatggccctagtgttcatcaagtacctccagagtgtccgcgtgggtcatcttgg
 gcgccatctctgtgatgatctcgtggtgtgctgtgctccaaaggccctctgagaatgctgtagaaactgccaggagag
 aaatgagcccatattccctgcctgatactcatctgcatggtgtggacggttggcatggcgaagctggaccctctctc
 aggggtgccctccagctcccctacgaccggagatggaagaagactcctatgacagtttggggagccttcatacccccga

DEFINITION Homo sapiens F-box protein SEL10 (SEL10) mRNA, complete cds.

ACCESSION AY008274 SEQ ID NO: 6

Ctcagcaggtcaggacatttggtaggggaaggtgaaagacaaaagcagcaggccttgggttctcagcctttaaacta
 ttattaaatataatattttaaatttagtggtagagcttttagtaatgtgcctgtattacatgtagagagtattcgtcaaccaagag
 gagttttaaagtgtcaaaaccgggaaaacctactctaaaccatggcttggctcctgttgatcttaaaagtcaaaagagcctct
 accacatcaaaccgtgatgaagatatttagcattagcatcattgcccaaggcctcccttttctgaagacggatgaaaagaa
 agttggaccatgggtctgaggtccgctcttttcttgggaaagaaccatgcaaagtcagaaatatacaagtagtaccactgggc
 ttgtaccatgttcagcaacaccaacaacttttggggacctcagagcagccaatggccaagggaacaacgacgccgaatta
 catctgtccagccacctacaggcctccaggaatggctaaaaatgttcagagctggagtggaccagagaaattgcttctta
 gatgaactcattgatagttgtgaaccaacacaagtaaaacatatgatgcaagtatagaacccagttcaacgagacttcatt
 tcattgtcctcctaaagagttggcactctatgtgctttcattcctggaacccaagacctgctacaagcagctcagacatgtcgc
 tactggagaattttggctgaagacaaccttctctggagagagaaaatgcaaagaagaggggattgatgaaccattgcacatca
 agagaagaaaagtaataaaaccagggttcatacacagtcctatggaaaagtgcatacatcagacagcacagaattgatacta
 actggaggcgaggagaactcaaatctcctaaggtgctgaaaggacatgatgatcatgtgatcacatgcttacagtttgggt
 aaccgaatagttagtgttctgatgacaacactttaaagtttgggtcagcagtcacaggcaaatgtctgagaacattagtggg
 acatacaggtggagtatggtcatcacaatgagagacaacatcatcattagtggatctacagatcggacactcaaagtgtgg
 aatgcagagactggagaatgtatacacaccttatatgggcatacttccactgtgcgttgtatgcattctcatgaaaaagagtt
 gttagcgggttctcgagatgccactcttaggggttgggatattgagacaggccagtggttacatgtttgatgggtcatgttcag
 cagtcgcgtgtgttcaatatgatggcaggagggttgttagtgagcatatgatttatggtaaagggtgtgggatccagagact
 gaaacctgtctacacacgttcaggggcatactaatagagtctattcattacagtttgatggtatccatgtggtgagtgatctc
 ttgatacatcaatccgtgttgggatgtggagacagggaattgcattcacacgttaacaggggcaccagtcgttaacaagtgg
 atggaactcaaagacaatattctgtctctgggaatgcagattctacagttaaatctgggatatacaaacaggacagtggtta
 caaacattgcaaggtccaacaagcatcagagtgtgtgacctgtttacagttcaacaagaactttgtaattaccagctcagat
 gatggaactgtaaaactatgggacttgaaaacgggtgaatttattcgaaacctagtcacattggagagtggggggagtggg
 ggagttgtgtggcgatcagagcctcaaacacaaagctggtgtgtgcagttgggagtcggaatgggactgaagaaaccaa
 gctgctggtgctggactttgatgtggacatgaagtgaagagcagaaaagatgaattgtccaattgttagacgatatactcc
 ctgcccttccccctgcaaaaagaaaaaagaaaaagaaaaaataccctgttctcagtggtgcaggatgttggcttg
 gggcaacagattgaaaagacctacagactaagaaggaaaagaagaagagatgacaaaccataactgacaagagaggcg
 tctgtgtctcatcataaaaggcttcttactgagggcagcttgcaaaatgagactttcaaatcaaacagggtgcaa
 ttattctttatttcttctccagtggctattggggcagtgtaatgctgaaacatcattacagattctgtagcctgttctttaccac
 tgacagctagacacctagaaggaactgcaataatatcaaacaaagtactggtgactttctaattagagagcatctgcaaca
 aaaagtcattttctggagtggaaaagcttaaaaaattactgtgaattgtttgtacagttatcatgaaaagctttttttttttt
 tngccaaccattgccaatgtcaatcaatcacagtattagcctctgttaatctatttactgttgcttccatatacattcttcaatgcat
 atgttgctcaaagggtggcaagttgtcctgggttctgtgagtcctgagatggatttaattcttgatgctgggtgctagaagtaggtct

tcaaatatgggattgtgtcccaaccctgtactgtactcccagtgcccaacttattatgctgctaaatgaaagaaagaaaa
 agcaaattatTTTTTTTctgtgtgacgttttagtcccagactgaattccaaatttgcctagtgttggttatggaaaaaga
 ctttttgcactgaaacttgagccatctgtgcctctaagaggctgagaatggaagagttcagataataaagagtgaagttgc
 ctgcaagtaaagaattgagagtggtgcaaaagcttatttctttatctgggcaaaaattaaaacacattccttgaacagagct
 attacttgcctgttctgtggagaaacttttcttttggggctgtggtgaatgatgaacgtacatcgtaaaactgacaaaatatt
 taaaaatataaaaacacaaaattaaaataaagttgctggtcagcttagtgtttacagtatttgggaaaacaactgttacagtt
 tattgctctgagtaactgacaaagcagaaactattcagttttgtagtaaaaggcgtcacatgcaaacacaaaatgaatgaaa
 cagtcaaatggtttgcctcattctccaagagccacaactcaagctgaactgtgaaagtgggttaacactgtatcctaggcgatc
 tttttcctccttctgtttatttttgnitgtttatttatagctgtattaaaacaatcagattcaagttggttaattttagttatgtaaca
 acctgacatgatggaggaaaacaacctttaaagggtgtgtctatggttgattcacttagaaattttatttctataacttaagt
 gcaataaaatgtgtttttcatgtt

Target genes (transcription factors):

DEFINITION Homo sapiens HES-related repressor protein 1 HERP1 mRNA,
 complete SEQ ID NO: 7

cds.

ACCESSION AF232238

Gtcgaccgcctgccaggccccggggagggaggaggcgggcgctcagggtgctgcgccccgctcggcgctccgagcttcc
 ggccgggctgtgccccgcgcggtcttcgccgggatgaagcgccctgcgaggagacgacctccgagagcgacatggac
 gagaccatcgacgtggggagcgagaacaattactcggggcaaaagtactgtctgtgattagattgaattctccaacaaca
 acatctcagattatggcaagaaagaaaaggagagggtattatagagaaaaggcgtcgggatcggataaataacagtttatct
 gagttgagaagacttgtgccaaactgctttgaaaaacaaggatctgcaaagttagaaaaagctgaaatattgcaaatgacagt
 ggatcattgaagatgcttcaggcaacagggggtaaggtactttgacgcacacgctcttgccatggacttcatgagcata
 ggattccgagagtgccaaacagaagttgcgcggtacctgagctccgtggaaggcctggactcctcggatccgctgcgggt
 gcggtgtgtctcatctcagcacttgcgccaccagcgaggcgccggccatgacatcctccatggcccaccaccatc
 atccgctccaccgcacacttggccgcccgttccaccacctgcccgcagccctgctccagcccaacggcctccatgcc
 tcagagtcaacccctgtcgcctctccacaacttcagaagtgcctcctgccacggctctgctctctcacggccacgtttgc
 ccatgcggaattcagccctccgaatgccatccacgggcagcgtcgcgccctgctgcccactctctccacctctcttgtcc
 ctctctgccaccgtccacgccgcagccgcagcagccaccgcggctgcacacagcttccctctgtccttcgcgggggcatc
 cccatgcttccccaaacgcagcagcagcagtgccgcggccacagccatcagccgcccctgtcagtatcagccacgtc
 cagtcctcagcagaccagcagtggaacaaacaataaaccttaccgacctgggggacagaagttggagcttttaaaattttc
 tgaacttctgcaatagtaactgaatgtcctcatttcagagtcagcttaaacctctgcacctgaaggtagccatacagatg
 ccgacagatccacaaggaacaataaagctatttgagacac

DEFINITION Homo sapiens HES-related repressor protein 2 HERP2 mRNA,
 complete

cds.

ACCESSION AF232239 SEQ ID NO: 8

Tcagtgtgtcggaaacgcaagcagccgagagcggagaggcgccgctgtagttaactcctccctgcccgccgcgcccagc
 cctccccaggaacccccaggagccagcatgaagcgagctcaccgccagtagctcctcggacagcgagctggacga
 gaccatcgaggtggagaaggagagtgccgacgagaatggaacttgagttcggtctaggttccatgtccccaactacatc
 tcccagatttggccagaaaaagacggagaggaataattgagaagcgccgacgagaccggatcaataacagtttgtctga
 gctgagaaggctggtacccagtgttttgagaagcaggatctgctaagctagaaaaagccgagatcctgcagatgacgt
 ggatcacctgaaaatgtgcatacggcaggaggaaaggttacttgacgcgcacgcccctgtatggactatcgagattg
 ggatttcgggaatgcttgccagaagttgcgcgttatctgagcatcattgaaggactagatgcctctgacctgctcagttcg
 actggtttgcacatcaacaactacgttcccagcgggaagccgcgagcggcgcccacgcgggctcggacacattccct
 gggggaccgtcttcggacatcacccgcacatcgccacccgctgttgcgtcccccagaacggccacgggaacgcgggca
 ccacggcctcacccacggaaccgcaccaccagggcaggtgggctcggcacatccggaggcgctgttgcgagcgc
 cccctagcggcagcttcggaccggtgctccctgtggtcacctccgcctccaaactgtcgtcgtcctctgctctcctcagtgcc

ctccctgtcgcccttccccttctcttcggctccttccacttactgtctcccaatgcactgagcccttcagcaccacgcaggct
gcaaaccttggcaagccctatagaccttgggggacggagatcggagctttttaaagaactgatgtagaatgagggagggg
aaagttaaaatcccagctgggctggactgttgcaacatcaccttaaagtcgtcagtaaaagtaaaaggaaaaaggta
cttcagataatttttttaaagactaaagggttgggttactttatcttttaagtgtttttcatcatgtcatgtattagcagtttt
aaaaactagtgtttaaatttgttcaagacattaaattgaaatagttagtataagccaacacttgtgatagggttactgtgcct
aatttacttgttaaccagaatgattccgttttgcctcaaaatttgggaatcttaacatttaggtatttttggctgtttttcctg
tatagtattggctgttttagaattaattttccaaaccactatgcttaattgaacatgattctgtttgtaatatatttgacagattaag
gtgtgtataaataatattcttttggggggaggggaactatattgaattttatattctgagcaaaagcgttgacaaatcagatgatc
agctttatccaagaagaagactagtaaattgtctgcctcctatagcagaaagggtgaatgtacaaactgttggtggcctgaatc
catctgaccagctgctggtatctgccaggactggcagttctgatttagtaggaggaccgctgatagggttaggtctcatttggg
gtgttgggtggaaaggaaactgaaggtaattgaatagaatacgcctgcatttaccagccccagcaacacaaagaatttttaac
acacggatctcaaatcacaaatgtaacatggataagtgatcatggtgtgcgagtggtcaattgagtagtacagtggaaact
gttaaatgcataacctaattttctgggactgccatattttttaaactggaaattttatgtgagtttcttttgggtcatggaact
gtggttggcaagggtattttaaagggttctgcctccttctcttatttatttaatttatttgggtataaaatatcattttcagg
tttattcttttagcaggtgtagttaaacgacctccactgaactgggttgacctctgtgtactgatgtgtgtgactaaataaaaa
agaaagaacaaagtaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

DEFINITION Homo sapiens hairy (Drosophila)-homolog (HRY), mRNA.

ACCESSION NM_005524 SEQ ID NO: 9

Atcacacaggatccggagctggtgctgataacagcggaatccccgtctacctctccttggctcctggaacagcgctact
gatcaccaagtagccacaaaataataaacctcagcacttgcctcagtagtttgtgaaagtctcaagtaaaagagacacaa
acaaaaattcttttctggaagaactccaaaataaaattctctagagataaaaaaaaaaaaaaaaaaggaaatgccagctga
tataatggagaaaaattcctcgtccccgggtgctaccacagcagtgtaacacgacaccggataaaccaagacag
caictgagcacagaaagtcataaagcctattatggagaaaagacgaagagcaagaataaatgaaagtctgagccagctg
aaaacactgattttggatgctctgaagaaagatgctcgcggcattccaagctggagaaggcggacattctggaaatgaca
gtgaagcacctccggaacctgcagcgggagcagatgacggctgcgctgagcacagaccaagtgtgctggggaagtac
cgagccggcttcagcagtgatgaacgaggtgacctgcttctgtccacgtgcgaggggcgtaataaccgaggtgcgcac
tcggctgctcggccacctggccaactgcatgacctagatcaatgccatgacctacccgggcagccgcacccgccttgc
aggcgccgccaccgccccaccgggacccggcgcccccagcagcgccgttcgcgccgccgccacctcgtgcc
atccccgggggagcgccgccccctccggcgccgccccctgcaagctgggcagccaggtggagagggcggttaagg
gtttggaggcttcagggtggtaccggctcccgatggccagtttcttctcattcccaacggggccttcgcgcacagcggc
cctgtcatccccgtctacaccagcaacagcgccacctcgtgggccccaacgcagtgtcaccttcagcgccccctcgtt
acggcgagctccatgtggaggcgtggcggaactgagggggctcaggccacctcctcctaaactccccaccacct
ctctccctccggactctaaacaggaactgaatactgggagagaagaggactttttgattaagtgggttactttgtttttta
ttctaagaagtactttttagagagagctgtattaagtactgacctatattgtatatatttatgttcatattggatt
gcgcctttagattataaaagctcagatgacattcgtttttacacgagatttcttttatgtgatgccaaagatgtttgaaatgct
cttaaaatcttcttggggaagttatttgagaaaataataaaagaaaaagtaaggcaaaaaaaaaaaaaaaaaaaaaa

DEFINITION Homo sapiens hairy and enhancer of split (Drosophila) homolog 2
(HES2), mRNA. SEQ ID NO: 10

GenBank Acc: BG470458

Gcgcggggacactcgtgcactggggcaaggtgccacgggcttctctcctaattgcctcacgtaacagttgagacccc
agagggcagcaaaactgggttogaattggagagccgtccaggcacagacaaattcattcatctgccagtgcccgctaact
gcggttccaggcgccggcgacgaattccagagctgccaccgctccccgcggagcatggggctgctcgcggggcag
gggacgcggcgagctgcgaagagcctgaagccgctgctggagaagcgccggcgcgcgcatcaaccagagcct
gagccagcttaaggggctcatctgcccgtgctggcggggaggtgctctggctggcacacctggcttccccctcatgc

tcangaactgcttactctacatccaggctcctgagcagccccagcttaagcttcagcagctccagggtaaatccatctc
cgcccagagctgactccggatctgccccagtgacaataacaagataaatgccttccattctcttcgtacttacaggatgtaac
cacatattacacagtgttccattgcggtaatgtttgtatagtttctgttcttctgtacatctggaagcctgtg

DEFINITION Homo sapiens bHLH factor Hes4 (LOC57801), mRNA.

ACCESSION NM_021170 SEQ ID NO: 11

Atggccgcagacacgccggggaaccgagcgctcgccgatggcaggagcgccggccagcgccagccggacccca
gacaagccccggagcgccggccgagcaccgcaagtcctccaagccggatggagaagcggcgccgagcgcggtattaa
cgagagcctcgtcagctcaaaacctcatcctggacgccctcagaaaagagagctcccgccactcgaagctggagaag
gcggacatcctggagatgaccgtgagacacctgcggagcctgcgtcgctgcaggtgacggccgcgctcagcgccgac
ccggccgttctgggcaagtaccgcgccggcttcacagagtgtctggcggagggtgaaccgcttctggccggctgcgagg
gcgtcccggccgacgtgcgtcccgcctgctgggacacctggcagcctgcctgcgccagctgggacctcccgcgcc
cgccctcgtgtccccggctgccccgcagaggccccagcgcccgaggctacgcggggcccgccgctgctgccatcgc
tcggcggcccccttccctctgctcgcgccgctgctgcccgggtctgacccgggcgctgcccgcgccccccaggcggg
gccgcaggggcccggtggccctggaggccgtggctgcgtga

HESR1, SEQ ID NO:12

>gi|5059322|gb|af151522.1|af151522 homo sapiens hairy and enhancer of split
related-1 (hesr-1) mrna, complete cds

cccaggaacccccagggagccagcatgaagcagctcaccgccagctacagctcctcggacagcgagctgg
acgagaccatcgaggtggagaaggagagtgccgacgagaatggaaacttgagttcggctctaggttccat
gtccccaactacatcttcccagattttggccagaaaaagacggagaggaataattgagaagcggcgacga
gaccggatcaataacagtttgtctgagctgagaaggctggtaccagtgcttttgagaagcagggatctg
ctaagctagaaaaagccgagatcctgcagatgaccgtggatcacctgaaaatgctgcatacggcaggagg
gaaaggttactttgacgcgcacgccttgctatggactatcggagtttgggatttcgggaatgacctggca
gaagttgcgcgttatctgagcatcattgaaggactagatgcctctgaccgcttcgagttcgactgggttt
cgcattctcaacaactacgcttcccagcgggaagccgcgagcggcgccacgcgggcctcggacacattcc

ctgggggacgctcttcggacatcaccgcacatcgccgacccgctgttctgctccccagaacggccacggg
aacgcgggacaccagggcctcaccacggaacgcgacccagggcaggtctgggctcggcacatccggagg
cgctgtctttgcgagcgcccttagcggcagcctcggaccggtgctccctgtggtcacctccgctccaa
actgtcgcgcctctgtctcctcagtggtcctcctgtcggccttcccttctcttccgctccttccac
ttactgtctcccaatgcactgagcccttcagcaccacgcaggtgcacaaacttggcaagccctatagac
cttgggggacggagatcggagctttttaaagaactgatgtagaatgagggaggggaaagttaaactccc
agctgggctggactgttgccaacatcaccttaaagtcgtcagtaaaagtaaaaggaaaaaggtacactttcagat
aattttttttaaagactaaaggtttgttgggttacttttatctttttaaagtgttttttcat
catgtcatgtattagcagtttttaaaactagttgttaaattttgttcaagacattaaattgaaatagtg
agtataagccaacactttgtgataggtttgtactgtgcctaatttactttgtaaaccagaatgattccgt
ttttgcctcaaaatttggggaatcttaacatttagtatttttgggtctgttttctccttgtagttatg
gtctgttttttagaattaattttccaaaccactatgcttaattgttaacatgattctgtttgttaattttt
gacagattaaaggtgtgtataaataatattcttttggggggaggggaactatattgaattttatatttct
gagcaaaagcgttgacaaatcagatgatcagctttatccaagaaagaagactagtaaatgtctgcctcct
atagcagaaaggtgaatgtacaaactgttgggtggccctgaatccatctgaccagctgctgggtatctgcca
ggactggcagttctgatttagttaggagagagccgctgtaggttaggtctcatttggagtggtggga
aaggaaactgaaggttaattgaatagaatacgcctgcatttaccagccccagcaacacaaagaatttttaa
tcacacggatctcaaatccacaaatgttaacatggataaagtcatggtgtgcgagtggtcaattgagtg
agtacagtggaactgttaaatgcataacctaattttcctgggactgccaatttttcttttaactggaaa
tttttatgtgagttttccttttgggtgcagtggaactgtggttgccaagggtattttaaagggttttctgccc
tccttctctttgatttattttaatttgatttgggctataaaatattttttcaggtttattcttttagca
gggtgtagttaaacgacctccactgaactgggtttgacctctgttgtactgatgtgtgtgactaaataaa
aaa

HEY 1

SEQ ID NO:13

>gi|20149602|ref|nm_012258.2| homo sapiens hairy/enhancer-of-split related with yrpw motif 1 (hey1), mRNA

tcagtgtgtgcggaacgcaagcagccgagagcgagagggcgccgctgtagttaactcctccctgcccgcg
gcgcggaccctccccagggaacccccagggaagccagcatggaagcgagctcaccocgagtagcagctcctcgg
acagcgagctggacgagaccatcgaggtggagaaggagagtgccgacgagaatggaaacttgagttcggc
tctaggttccatgtccccaaactacatcttcccagattttggccagaaaaagacggagaggaataattgag
aagcgccgacgagaccggatcaataacagtttgtctgagctgagaaggctggtagccagtgcttttgaga
agcagggtatctgctaagctagaaaaagccgagatcctgcagatgacgctggatcaactgaaatgctgca
tacggcaggagggaaagggttactttgacgcgcacgccccttgctatggactatcggagtttgggatttcgg
gaatgcctggcagaagttgcgctgtatctgagcatcattgaaggactagatgcctctgaccgccttcgag
ttcgactggtttcgcatctcaacaactacgcttcccagcggggaagccgcgagcgggcgccacgcgggct
cggacacatctccttggggaccgcttctcgacatcaccgcacatcgcgaccgcgctgttgcgtgcccag
aacggccacgggaacgcggggcaccacggccctcaccacgggaacgcaccaccagggcaggctgggtcgg
cacatccggaggcgccgtgctttgcgagcgccccctagcggcagcttcggaccgggtgctccctgtggtcac
ctccgcttccaaactgtcgtgctctgctctcctcagtgccctccctgtcggccttcccttctcttcc
ggctccttccacttactgtctcccaatgcactgagcccttcagcaccacgcagggtgcaaaccttggca
agccctatagaccttgggggacggagatcggaacttttaagaactgatgtagaatgagggggaaa
gtttaaactcccagctgggctggactgttgccaacatcaccttaaagtcgtcagtaaaagttaaaaggaa
aaaggtagactttcagataatttttttttaaaagactaaagggttgggttacttttatctttttaa
tgttttttcatcatgtcatgtatttagcagtttttaaaactagttgttaaattttggttcaagacattaa
attgaaatagtagtagtataagccaaactttgtgtaggtttgtactgtgctaatttacttttgtaacca
gaatgattccgtttttgcctcaaaatttggggaatcttaacatttaggtatttttgggtctgttttctcc
ttgtatagttatggtctgttttttagaatttaatttccaaaccactatgcttaatgtaacatgattctgt
ttgttaatttttagcagattaagggtgtgtataataatattcttttggggggagggggaactatattga
attttatatttttagcagaagcgttgacaaatcagatgacgctttatccaagaagaagactagtaaa
ttgtctgcctcctatagcagaaagggtgaatgtacaaactgttgggtggcctgaatccatctgaccagctgc
tggtatctgcccaggactggcagttctgatttagttaggaggaccgctgatagggttaggtctcatttggag
tgttgggtggaaggaaactgaaggtaattgaatagaatacgcctgcatttaccagccccagcaacacaaa
gaatttttaatacacacggatctcaaaattcacaaatgttaacatggataagtgatcatggtgtgcgagtg
tcaattgagtagtagcagtggaactgttaaatgcataacctaattttcctgggactgccataattttcttt
taactggaaatttttatgtgagtttctcttttgggtgcagtggaactgtgggttgccaagggtattttaaagg
cttctcgtcctctctctcttcttgaatttatttaatttgatttgggtctataaaatatcatttttcagggtttat
cttttagcaggtgtgagttaaacgacctccactgaactgggtttgacctctgttctgtatgtgtgtg
actaataaaaaaagaaagaacaaagtaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

HEY 2 SEQ ID NO: 14

>gi|6912413|ref|nm_012259.1| homo sapiens hairy/enhancer-of-split related with yrpw motif 2 (hey2), mRNA

tcggcgctccgagcttccggccgggctgtgccccgcgcggtcttcgcggggatgaagcgccctgcgagga
gacgacctccgagagcgacatggacgagaccatcgacgtggggagcgagaacaattactcggggcaaaagt
actagctctgtgatttagattgaattctccaacaacaacatctcagattatggcaagaagaaaggagag
ggattatagagaaaaggcgctgggacgggatacgaataaacagtttatctgagttgagaagacttggccaac
tgcttttgaaaaaacaaggatctgcaaaagttagaaaaagctgaaatatgcaaatgacagtggatcatttg
aagatgcttcaggcaacagggggtaaaggctactttgacgcacacgctcttgccatggacttcatgagca
taggattccgagagtgcccaacagaagtggcgcggtacctgagctccgtggaaggcctggactcctcgga
tccgctgcgggtgcggttgtgtctcatctcagcacttgccacccagcgggaggcgcccatgaca
tccctccatggccaccacatcatccgctccaccgcacatcactgggcccgcgcttccaccacctgccc
cagccctgctccagcccaacggcctccatgcctcagagtcaccccttgtgcctctccacaacttcaga
agtgcctcctgcccacggctctgctctcctcagcgccacggtttgcccagtcggattcagccctccgaatg
ccatccacgggcagcgctcgccctgctgcccactctcctccacctctctctgtccctctctgocaccg
tccacgcccagcgcgagcagccaccgcggtgcacacagcttccctctgtccttcgcgggggcatcc
catgcttcccccaaacgcagcagcagcagtggtgcgcccagccatcagcccgcccttgtcagtatca
gccagctccagtcctcagcagaccagcagtggaacaaacaataaaccttaccgaccctgggggacagaag
ttggagctttttaaatttttcttgaactcttctgcaatagtaactgaatgtcctccatttcagagtcagct
taaaacctctgcacctgaaggtagccatacagatgcccagacagatccacaaaggaaacaataaagotattt
gagacacaaacctcagagtggaatgtggtattctcttttttctctcccttttttgggttggttcaag
gcagctcggtaactgacatcagcaactttgaaaacttccacactgttaccatttagaagtttctctggaa
aatatatgtgaacctacatccagcagtgcatcagttgtctgaattggggaagttaaattgcccctgactga
attctcttgagacttagatgggacatacatatagagagagagtgagagagtcgtgttctgtaagtcct
gagcttaggaagttttctctggatatataacattgcacaagggaagacgagtggtggaggatagggttaag
aaaggaaagggagagaagtcttgcaataggctgcagacattttaataccatgccagagaagagttattctg
ctgaaaccaacagggttttactggtcaaaatgactgtgaaataattttcaagttgaagatctagtttt
atcttagtttgccttcttgtacagacatgccaagaggtgacatttagcagtgcatgggtataagcaatt
atttcatcagttctcagattaacaagcatttctgctctgcctgcaggccccaggcaactttttttttgg
atggctcaaaatatggtgctgctttatataaaccttaccatttatatagtcacctatgagcagttgccta
ccatggttccaccagaggttttaattcatgccaacttgaaaactctccagttttagtaggagtttgggtt
aatttattcagtttcttaggactatttttatatatatttctcttctcctaatgatgcaacat

gagctgagaaggctggtagccagtgcttttgagaagcagggatctgctaagctagaaaaagccgagatcc
 tgcagatgacccgtggatcacctgaaaaatgctgcatacggcaggaggaaaggttactttgacgcgcacgc
 ccttgctatggactatcggagtttgggatttcgggaatgcctggcagaagttgcgcgcttatctgagcatc
 attgaaggactagatgcctctgacccgcttcgagttcgactggtttcgcatctcaacaactacgcttccc
 agcgggaagccgcgagcggcgccccacgcgggctcggacacattccctgggggacgctcttcggacatca
 cccgcacatcgcgacccgctgttgctgccccagaacggccacgggaacgcgggacccacggcctcacc
 acggaaccgcaccaccagggcaggctgggctcggcacatccggaggcgctgctttgcgagcgcccccta
 gcggcagcctcggaccggtgctccctgtggtcacctccgcctccaaactgtgcgcgctctgctctcctc
 agtggcctccctgtcggccttccccttctcttctcggtccttccacttactgtctcccaatgcactgagc
 ccttcagcaccacgcaggctgcaaaccttggcaagccctatagaccttgggggacggagatcggagctt
 tttaa

hrt2 SEQ ID NO:17

>gi|11127955|gb|af311884.1|af311884 homo sapiens hairy-related transcription
 factor 2 mrna, complete cds

atgaagcgccctgcgaggagacgacctccgagagcgacatggacgagaccatcgacgtggggagcgaga
 acaattactcggggcaagtagctctgtgattagattgaattctccaacaacaacatctcagattat
 ggcaagaaagaaaaggagagggattatagagaaaaggcgtcgggatcggataaataacagtttatctgag
 ttgagaagacttggtgccaactgcttttgaaaaacaaggatctgcaaagttagaaaaagctgaaatattgc
 aaatgacagtggatcatttgaagatgcttcaggcaaacagggggtaaaggctactttgacgcacacgctct
 tgccatggacttcatgagcataggattccgagagtgccctaacagaagttgcgcggtacctgagctccgtg
 gaaggcctggactcctcggatccgctgcggtgcggttggtgtctcatctcagcacttgcgccaccacgc
 gggaggcgggcccatgacatcctccatggccccaccaccatcatccgctccaccgcgcatcactgggcccgc
 cgcttccaccacctgccccgagccctgctccagcccaacggcctccatgctcagagtcacacccttgt
 cgctctccacaacttcagaagtgcctcctgcccacggctctgctctcctcaaggccacgctttgcccattg
 cggattcagccctccgaatgccatccacggcgagcgtcgccccctgctgctgccacctctctccacctctct
 cttgtccctctctgccaccgtccacgcccgcagccgcagcagccaccgcggctgcacacagcttccctctg
 tccttcgcgggggcatcccatgcttcccccaaacgcgagcagcagcagtgggccgcggccacagcatca
 gccgccttggtagtatcagccacgtccagtcctcagcagaccagcagtggaacaaacaataaacctta
 ccgaccttgggggacagaagttggagctttttaa

hrt3

SEQ ID: NO: 18

>gi|11127957|gb|af311885.1|af311885 homo sapiens hairy-related transcription
 factor 3 mrna, complete cds

atgaagcgaccacaaggagcgcgagcggctccgacggggagtcgacggaccatcgacgtggggccaagagg
 gccagctgagccagatggccaggccgctgtccaccctccagctcttcgcagatgcaagccaggaaagaaagc
 cagagggatcatagagaaaacggcgctcgagaccgcatcaacagtagcctttctgaattgcgacgcttggtc
 cccactgcctttgagaaaacagggctcttccaagctggagaaaagccgaggtcttgagatgacggtggatc
 acttgaataatgctccatgccactgggtgggacaggattctttgatgcccagccctggcagttgactccg
 gagcatgtggttttcgggagtgccctcactgaggtcatcaggtacctgggggtccttgaagggcccagcagc
 cgtgcagaccctccggtccggttccctctctccaccctcaacagctacgcagccgagatggagccttcgc
 ccacgcccactggccctttggccttccctgctggccctgggtctttctccatagctgtcggggctgccc
 agccctgagcaaccagctcgccatcctgggaagagtgcacagccctgtcctcccggtgtctcctctcct
 gcttaccctatcccagccctccgaaccgctccctctcgcagagccacagggcatcatcctgccagcccgga
 ggaatgtgtgcagcagtcaggggcatcttccaccggaggcccgccccctagagaggccagcaccctcgc
 ttgtgctgtgccccagcaggggctgccaggagcagccacatcgctccctcctgagcttctcctcc
 ccaacaccctggtcctacagggctcggtgcttacgtggctgttccacccccaaactcatcctcccaag
 ggccagctgggagggccagcgggagccatgctctaccactcctgggtctctgaaatcactgaaatcggggc
 tttctga

chf1 SEQ ID NO: 19

>gi|6636408|gb|af173901.1|af173901 homo sapiens basic helix-loop-helix
 factor 1 (chf1) mrna, complete cds

cggcgcgctcgacgggaaagagccgctagagcagaccgcgcgcgcggagccgcgcctgcccaggccc
 ggggagggagggagggcggtcagggctgctgcgccccgctcggcgtccgagcttcggccgggctgtgccc
 ccgcggtcttcgccccgatgaagcgcctcgcaggagacgacctccgagagcgaatgggacgagacc
 atcgacgtggggagcgagaacaattactcggggcaagtagctctgtgattagattgaattctccaa
 caacaacatctcagattatggcaagaaaaggagagggattatagagaaaaggcgtcgggatcggat
 aataaacagtttatctgagttgagaagacttggtgccaactgctttgaaaaacaaggatctgcaaagtta
 gaaaaagctgaaatattgcaaatgacagtggatcatttgaagatgcttcaggcaacaggggttaaaggct
 actttgacgcacacgctcttgccatggacttcatgagcataggattccgagagtgccctaacagaagttgc
 gcgggtacctgagctccgtggaaggcctggactcctcggatccgctgcgggtgcggcttggtgtctcatctc
 agcacttgccacccagcgggagggcgccatgacatcctccatggccccaccaccatcatccgctcc
 acccgatcaactgggcgcgcgcttccaccactgcccgcagccctgctccagcccaacggcctccatgc
 ctcagagtcaacccttgtgcctctccacaacttcagaagtgcctcctgcccacggctctgctctcctc
 acggccacgctttgcccatgaggattcagccctccgaatgccatccacgggcagcgtcgcctcgcctg

aggggtgctgcgccccgcctggcgctccgagcttccggccggggtgtgcccgcgcgggtcttcgcgggtag
aagcgccccctgcgaggagacgacctccgagagcgacatggacgagaccatcgacgtggggagcgagaaca
attactcggggcaagtagtactgctgtgatttagattgaatttcccaacaacaacatctcagattatggc
aagaagaaaaaagagaggggattatagagaaaaaggcgtcgggactcggatataaataaacagtttatctgagttg
agaagacttgtgccaaactgcttttgaaaaaacaaggatctgcaaagttagaaaaagctgaattatgcaaa
tgacagtggaatcatttgaagatgcttcaggcaacagggggtaaaggctactttgacgacacagctcttcg
catggactctcatgagcataggattccgagagtgcttaacagaagttgcgcgggtacctgagctccgtggaa
ggcctggactcctcggaatccgctgcgggtgcgggttgtgtctcatctcagcacttgcgccaccacgagg
aggcggcgggccatcgacatcctcatgtggcccaccacatcatcgcgtccaccgcgcatcactgggcgcgcgc
cttccaccacctgcgccgcagccctgctccagcccaacggcctccatgctcagagtgcaaccttgtgcgc
ctctccacaacttcagaagtgcctcctgccacagggtctgctctcctcacggccacggtttgccccatgagg
attccgacctccgaattgccatccacggcgagcgtgcgccctcgctgcacctctctccacctctctctt
gtccctctctgccaccgtccagcgcgcgagcgcgagcagccaccgcggctgcacacagcttccctctgtcc
ttcgcggggggcattcccatgcttccccaaaacgcgagcagcagcagtgggcgcgggccacagccatcagcc
cgcccttgtcagtatcagccacgctccagtcctcagcagaccagcagtggaacaaacaataaaccttacgc
acctggggggacagaagttggagctttttaatttttcttgaaactctctgcaatagtaactgaatgtcct
catttcagagtcagcttaaaacctctgcacctgaaggtagccatacagatgccgacagatccacaaga
gaacaataaaagctatttgagacacaaacctcagagtggaattgtggtattctctttttctctcctc
ttttgtttgggtccaaggcagctcggttaactgacatcagcaacttttgaaaaacttcacacttgtttaccat
ttagaagtttcttggaataatataatggaccgtacatccagcagtgcatcagtatgtctgaattggggaag
taaaagtccctgactgaattctctctggagactagatgggacacatacatatagagagagagtgagagagtc
gtgttctcgtaagtgctgagcttaggaagttttctcttggtatatataacttgacagaagggaagacgagt
gtggaggataggttaagaaaggaaagggaacagaagcttgcgaataggctgcagaca

DEFINITION Homo sapiens hairy/enhancer of split 6 (HES6) mRNA, complete cds.
ACCESSION AF260237 SEQ ID NO: 22
<p>Ctccgggtccccgccgtccccgtccccgtctcctagccccgtccgcgtccccggcggagcgggcatggcgccaccc gcgggcctggccgggaccgtgtggggcctgaggatgaggacggctgggagacgcgaggggaccgcaaggcccgga agccccctggtggagaagaagcggcgcgcgcggaatcaacgagagcctgcaggagctgcggctgctgtggcgggcgcc gaggccaagctggagaacgccgaagtgtggagctgacgggtgcggcgggtccagggtgtgctgcggggccggggcgcg cgagcgcgagcagctgcaggcggaagcgcgagcgcgttcgctgccggctacatccagtgcacgaggtgcacac gttcgtgtccacgtgccaggccatcgacgctaccgtcgtgcggagctcctgaaccatctgctcagtgccatgccgtgcgt gagggcagcagctccaggatctgctggggacgccctggcgggggccacctagagccccctggacggagtggctggcct gcggggggcgctccgggatcccccaataccagccccccgggtcctggggacgacctgtgctccgacctggaggaggcc cctgaggctgaactgagtcaggctcctgctgagggggccgacttggtgcccgagccctgggcagcctgaccacagccc aaattgccccggagtgtctggaggcccttggtaccaatgccagccagagtcctgcgggggtggggcccgccctccctggat ctctccctcctcccaggggtcagatgtggtggggtagggccctggaagtctcccagggtctccctccctcctctgatggat ggcttcgagggcagccccctgtaaccagcccagtcaggccccagccccgttcttaagaaacttttagggaccttcagct ctggagtgggtggaggaggagctacgggcaggaggaagaattttagagctgccagcgtctcccaggttcacca cccaggcttcaccagccctgtgcgggctctgggggcagaggtggcagaaatggtgctgggcactagtgttcaggcagc cctgggctaacaagcgtgaacttgccacttcagcggggagatgagaggcaggtgcactgagctgcactcccagagc tgtgatgctctgtacatctgtttgtagcacacttgagttgtgtatccattgacatcaaatgtgacaattttactaaataagaatt ttggagttagtt</p>
DEFINITION Homo sapiens bHLH factor Hes7 (HES7), mRNA.
ACCESSION NM 032580 SEQ ID NO: 23
<p>Atggtcaccgggagtcgagctgagaatagggacggcccaagatgctcaagccgcttgggagaagcggcgccggga ccgcatcaaccgcagcctggaagagctgaggctgctgctgctggagcggaccgggaccagaacctccggaacccgaa gctggagaaaagcggagatattggagttcgccgtgggctacttgaggagcgaagccgggtggagccccgggggttccc cgggtcccagtcaggacccaaggcgtcgcagctgctacttgcgggttccgcgagtgccctgcttcgcttggcgcc atcgcgcacgacgccagcccagccgcccgcgccagctcttccgcgctgcacggctatctgcgccccaaaccgcccc ggcccaagccggtagatccgaggcctccagcgcgcgccatccctggacccccgcgcaccggcccttggccctgcgc tgcaccagcgcggggcagtcaccagggccaccctagccgcgctgcgcagtggtccccatccctctgctccccgcgcgc cggggattctggcgccggcgccctcaccgactgctgccgccaccgcccgcctcacagacaagacggggcgcc ccaaggccccgctgccccgcgcggcgtttctggagaccttggccctga</p>
<u>Wnt pathway</u>
Wnt ligand processing factors:
DEFINITION Homo sapiens low density lipoprotein-related protein 1
(alpha-2-macroglobulin receptor) (LRP1), mRNA.
ACCESSION XM 017228 SEQ ID NO:24
<p>Cagcgggtgcgagctccaggcccagtcactgaggaggcggaacaaggggagccccagagctccatcaagccccctc caaaggctcccctacccggtccacgccccccacccccctccccgcctcctccaattgtgcattttgcagccggaggcg gctccgagatggggctgtgagcttcgccggggagggggaaagagcagcagaggagtgaagcgggggggtgggggtga agggtttgatttcggggcagggggcgcccccgctcagcaggccctcccaaggggctcggaaacttacctttcaccc acgccccctggtgcgctttgccgaaggaaagaataagaacagagaaggaggagggggaaaggaggaaaagggggacc cccaactgggggggggtgaaggagagaagtagcaggaccagagggggaaggggctgctgcttgcacagccacacct gctgacccccgcggttgcctcctgctgctgcccctgctctcagctctggtcgcggcggtatcgacgccccaaagactgcagc</p>

cccaagcagtttgctgcagagatcaaataacctgtatctcaaagggtggcgggtgcgacggtagagggactgccaga
 cggatctgacgaggccctgagattgtccacagagtaaggcccagcgatgccagccaaacgagcataactgcctgggta
 ctgagctgtgtgtcccatgtcccgcctctgcaatgggggtccaggactgcatggacggctcagatgaggggccccactgcc
 gagagctccaaggcaactgctctgcctggggtgccagcaccattgtgtcccacactcgtgggcccacctgtactgca
 acagcagcttcagcttcaggcagatggcaagacctgcaaagatttgatgagtgtcagtgtagggcacctgcagccagct
 atgcaccaacacagacggctcctcatatgtggctgtgtgaaggataacctctgcagccggataaccgctcctgcaaggcc
 aagaacgagccagtagaccggccccctgtgtgtgatagccaactcccagaacatctggccacgtacctgagtggggc
 ccaggtgtctaccatcacacctacgagcacgcggcagaccacagccatggacttcagctatgccaacgagaccgtatgct
 ggggtgatgtggggacagtgctgctcagacgcagctcaagtgtgcccgcctggcctaaagggttcgtggatgag
 cacaccatcaacatctccctcagctgcacc

DEFINITION Homo sapiens low density lipoprotein-related protein 2 (LRP2),
 mRNA.

ACCESSION XM 002645 SEQ ID NO:25

Gcagacctaaaggagcgttcgctagcagaggcgctgccgggtgcgggtgtgctacgcgcgccacctcccggggaaggaa
 cggcgaggccggggaccgtcgcggagatggatcgcggggccggcagcagtggtgcacgctgctcctggctctcgtcg
 cctgcctagcgcggccagtgccaaagtgtgacagtgcgcatttgcgtgtggaagtgggcattgcatccctgcagact
 ggaggtgtgatgggacaaagactgttcagatgacgcggatgaaattggctgcgctgtgtgacctgccagcagggtattt
 caagtgccagagtgagggacaatgcatccccaaactcctgggtgtgtgaccaagatcaagactgtgatgatggctcagatga
 acgtcaagattgtcacaaagtacatgctcaagtcacagataacatgctccaatggtcagtgtatcccaagtgaatacaggt
 gcgaccacgtcagagactgccccgatggagctgatgagaatgactgccagtaccaacatgtgagcagcttactgtgaca
 atggggcctgctataacaccagtcagaagtgtgattgaaagtgtgattgcagggactcctcagatgaaatcaactgcagctg
 agatatgctgcacaatgagtttcatgtgcaatggagagtgtatccctgtgcttatgtctgtgacctgacaatgattgcca
 agacggcagtgacgaacatgcttgaactatccgacctgcgggtgttaccagttcacttgccccagtggccgatgcatttatc
 aaaactgggtttgtgatggagaagatgactgtaagataatggagatgaagatggatgtgaaagcggctcctcatgatgtcat
 aaatgttcccaagagaatggcttgcgcagatgcgggacgatgcatctccattataaagtgtgtgatggatttttagattgcc
 caggaaagagaagatgaaaacaactagtaccggaaaatactgtagtactctgtgctctgccttgaactgccagtacca
 gtgccatgagacgccgtatggaggagcgtgttttgcctccaggttatcatcaaccacaatgacagccgtacctgtgtg
 agttgatgattgccagatatggggaatttgaccagaagtgtgaaagccgacctggccgtcacctgtgccactgtgaaga
 aggttatatctggagcgtggacagtattgcaaagctaattgattcctttggcgaggcctccattatcttccaatggtcgggat
 tigttaattggtgatattcatggaaggagcttccggatcctagtggagtctcagaatcgtggagtggccgtgggtgtggtttc
 cactatcacctgcaaagagtttttgacagacaccgtgcaaaataaggtttttcagttgacattaatggtttaatatccaaga
 ggttctcaatgtttctgttgaaccccagagaacctggctgtggactgggttaataataaaatctatctagtggaaaccaaggt
 caaccgatagatatggtaaatttgatggaagctatcgggttaccctataactgaaaactggggcatcctagagggaattg
 ccgtggaccaactgttggttatttctcagattgggagagccttctggggaacctaaagctggaaggggcattcatgg
 atggcagcaaccgtaaaagacttggtgaaaacaaagctgggatggcctgctgggtaactctggatatgatacgaagcgtg
 ttactgggttgactctcggttgattacattgaaactgtaacttatgatggaattcaagggaagactgtagttcatggaggctc
 cctcattctcatcccttggagtaagcttattgaaggctcaggtgttctttacagattggacaaagatggccgtgctgaaggca
 aacaagttcacagagaccaaccacaagtgtactaccaggcttccctgaggccctatggagtgactgtttaccattccctca
 gacagccctatgctaccaatccgtgtaagataacaatgggggtgtgagcaggtctgtgctcagccacagaacagata
 atgatggtttgggttccgttgcaagtgcacattcggttccaactggatacagatgagcggcactgcattgctgttcagaattt
 cctcatttttcatcccaagttgctattcgtgggatcccggtcaccttgcctaccaggaagatgtcatggttccagtttcgggga
 atccttcttcttctgctgggattgatttgacgcccaggacagcactatctttttcagatatgtcaaaacacatgattttaagca
 aaagattgatggcacaggaagagaaattctcgcagctaacagggtggaaaatgttgaaagtttgcttttgattggattcaa
 agaattctctattggacagactctcattacaagagtatcagtgctatgaggctagctgataaaacgagacgcacagtagttcag
 tatttaataaaccacggctcgggtgtagttcatcttttgcgggtatctattcttactgattgggtccgtcgtctaaaattatga
 gagcatggagtgcggatctaccccttgcctgtaataaacactacttggatggcccaatggcttggccatcgattgggct
 gcttcacgattgtactgggtagatgcctattttgataaaattgagcacagcacctttgatggttagacagaagaagactgggc

catatagagcagatgacacatccgtttggacttgccatctttggagagcattatcttttactgactggagactgggtgccattat
tcgagtcaggaaagcagatggaggagaaatgacagttatccgaagtggcatgcttacatactgcatttgaaatcgtatgatg
tcaacatccagactgggttaacgcctgtaataacccacgcacctaacggtagctgcagccacttctgcttcccggtgccaa
aatttccagcgagtggtggtggccttatggaatgaggctggcttccaatcacttgacatgcgagggggacccaaccaatg
aaccaccacagagcagtggtgcttatttcttccctgtaaaaatggcagatgtgtgcccactatctctgtgatggagt
cgatgattgtcatgataacagtgatgagcaactatgtggcacacttaataacacctgttcatcttgcggcttccactgtggccat
ggggagtgcattcctgcacactggcgctgtgacaaacgcaacgactgtgtggatggcagtgatgagcacaactgccccac
ccacgcacctgcttctgccttgacaccaatacacctgtgataatcaccagtgatctcaagaactgggtctgtgacacag
acaatgattgtggggatggatctgatgaaaagaactgcaattgcagagacatgccaacctagtcagtttaattgccccat
catcgatgtattgacctatcgtttgtctgtgatggtgacaaggattgtgtgatgatctgatgaggttggtgtgtattaaactgt
actgcttctcaattcaagtgtgccagtggggataaatgtattggcgtcacaaatcgttgtgatggtgttttgattgcagtgcacaa
ctcggatgaagcaggctgtccaaccaggcctcctggtatgtgccactcagatgaattcagtgccaagaagatggtatctgc
atcccgaaacttctgggaatgtgatggcatccagactgcctctatggtatctgatgagcacaatgcctgtgtccccaagacttg
cccttcatcatatttccactgtgacaacggaaactgcacccagggcatggctctgtgatcgggacaatgactgcggggat
atgagtgtatgagaaggactgccctactcagcccttctgctgtcctagtgtggcaatggcagtgcttggccataacatctgtgtg
aatctgagtgtagtggtgatggcatctttgactgccccaatgggacagatgagtcaccactttgcaatgggaacagctgctc
agatttcaatgggtggttactacagagtggtgttcaagagcccttggggctaaatgcctatgtccattgggattcttacttgcca
atgatttcaagacctgtgaagacatagatgaatgtgatattctaggctctttagccagcactgttacaatatgagaggttcttctc
cggtgctcgtgtgatacaggctacatgttagaaagtgtgggaggacttgcaaaagtacagcatctgagagctgctgttactt
gtggcaagtcagaacaaaattattgccgacagtgctacctcccagggtccacaatatctattcattggtcagaaatggttcttac
attgtagctgttatttattcaattagtggctgtatcttttggctgatgcaactcagggtaaaacctggagtgctgttcaaaat
ggaaaggacagaagagtggatttgacagtagcatcatcttactgaaactattgcaatagattgggtaggtcgtaatctttac
tggaacagactatgctctggaaacaattgaagtctccaaaattgatgggagccacaggactgtgctgattagtaaaaacctaa
caaatccaaggaggactagcattagatcccagaatgaatgagcatctactgttctggtctgactggggccaccacctcgcacat
cgagcgagccagcatggacggcagcatgcgcactgtcattgtccaggacaagatcttctggccctgcggcttaactattga
ctacccaacagactgcttacttcatggactcctatcttgattacatggacttttggattataatggacaccatcgagacag
gtgatagccagtgtttgattatacggcacccctatgccctaactctcttgaagactctgtgtactggactgacctgctactc
gtcgggttatcgagccaacaagtggcatggagggaaccagtcagttgtaatgtataatattcaatggcccttgggattgtt
gcggttcaiccttgcgaacaaacaaattccgtgaatccatgtgcctttccgctgcagccatctctgcttcttctcacagg
ggcctcatttttactcctgtgtttgtccttcaggatggagctgtctcctgatctcctgaattgcttgagagatgatcaaccttctt
aataactgtaaggcaacataataattttggaatctcccttaactcctgaggtgaagagcaatgatgctatggtcccatagcagg
gatacagaatgggttagatgttgaattgatgatgctgagcaatacatctattgggtgaaaatccagggtgaaattcacagagt
gaagacagatggccaacaggacagtatttgccttatatctatggtggggccttctatgaacctggccttagattgatttc
aagaaacctttattctaccaatcctagaactcagtcacatcagggtttgacactccacggagatatcagatacagaaaaacatt
gattgccaatgatgggacagctcttggagttggctttccaattggcataactgttgatcctgctcgtgggaagctgtactggtc
agaccaaggaactgacagtggggcttctgccaagatgcacagtgtacatggatggcacatctgtgaaaactctcttact
gggaacctcgaacacctggagtgtgctactcttgacatcgaagagcagaaaactctactgggcagtcactggaagaggagt
gattgaaagaggaaacgtggatggaacagatcgaatgatcctggtacaccagcttccaccctggggaattgcagtcca
tgattcttcttattatactgatgaacagtatgaggtcattgaaagattgataaggccactggggccaacaaaatagtcttg
agagataatgttccaaatctgaggggtcttcaagttatcacagacgcaatgccgccgaatcctcaaatggctgtagcaacaa
catgaatgcctgtcagcagattgcctgcctgtaccaggaggattgtttcctgcgcctgtgccactggatttaactcaatcct
gataatcggctcctgctctccataataactcttctattgttgttcaatgctgtctgcaatcagagggttagcttggaaattgtcagatc
atcagaaacctgggtgccggtggcaggccaaggacgaaacgcactgcatgtggatgtggatgtgtcctctggcttatttat
tggtgtgattttagcagctcagtggtcatctgataatgcgatccgtagaattaaaccagatggatcttctctgatgaacattgtga
cacatggaataggagaaaaatggagtccgggtattgcagtggattgggtagcaggaaatctttatttaccatgccttgggtt
ctgaaacactgatagaagttctgcggatcaataactactaccgccgtgttcttcttaaaagtcacagtggacatgcctaggcata
ttgtttagatccaagaacagataccttcttgggctgactatgggcagagaccaaaagattgagcgttcttcttactgtac

caatcgaacagtgtgtgtcagagggcattgtcacaccacggggcttggcagtggaaccgaagtgtggtacgtttattgg
gttgatgattcttttagatataattgcaaggattcgtatcaatggagagaactctgaagtgttctgttggtacgttaccacac
tccttatggcatcactgttttgaattctatcatatgggtagataggaattgaaaaagatcttcaagccagcaaggaacca
gagaacacagagccaccacagtataagagacaatatcaactggctaagagatgtgaccatctttgacaagcaagtcca
gccccgtcaccagcagaggtcaacaacaacccttgcctggaaaacaatgggtgggtgctctcatctctgctttgctctgctg
gattgcacacccccaaatgtgactgtgccttgggaccctgcaaaagtgtggaagaattgtgccatttcaacagaaaatttc
ctcatcttgccttgtctaattccttgagaagcttacacttggaccctgaaaaccatagcccaccttccaaacaataaatgtgg
aaagaactgtcatgtcttagactatgacagtgttaagtatagaatctacttcacacaaaatttagcctctggagttggacaga
tttctatgccaccctgtcttcagggatccatactccaactgtcattgcttcaggtatagggactgtgtggtggtgctttgac
tggtactatagaagaatttattacagtgtactaccicaaccagatgattaattccatggctgaagatgggtctaaccgcactgtg
atagcccgcgttccaaaaccaagagcaattgtgttagatccctgccaaagggtacctgtactgggtgactgggatacacatg
ccaaaatcgagagagccacattgggaggaaacttccgcgtacccattgtgaacagcagctgtggtcatgccagtggtgctga
ctctggactatgaagaggaccttctactgggtggatgctagtctgcagaggattgaacgcagcactctgacgggctgga
tcgtgaagtcattgtcaatgcagccgttcatgctttggcttgcactctctatggccagtataattactggactgactgtacacaca
aagaattaccgagtaacaatatgacgggtcaggtcagattgcaatgaccacaaatttgctctccagcccagggggaatc
aacactgttgaagaaccagaaacaacagtgtacaatccttgaacagtttaattgggggtgcagccatactgtgcac
cagggtccaaatgggtccgagtgccagtgccacatgagggcaactggtattggccaacaacaggaagcactgcatgtgg
acaatgggtgaacgatgtggtgcatcttccctcacctgctccaatgggcgctgcatctcgggaagagtggaggtgtgataatgac
aacgactgtggggatggcagtgatgagatggaaagtgtctgtgcacttcacacctgctcaccgacagccttcacctgtgcc
atgggcgatgtgtccaatacttaccgctgtgattactacaatgactgtggtgatggcagtgatgagggcagggtgctgttc
agggactgcaatgccaccacggagtttatgtcaataacagaaggtgcatactcgtgagttatctgcaatgggtgtagaca
actgccatgataataacacttcagatgagaaaaattgcctgtatgcacttgcagctgtgatacacaaaaatgtcataattcaa
atattgtattcctcgcgtttattgtgtgacggagacaatgactgtggagataacagtgtgaaaacctactattgcaccact
cacacgtgcagcagcagtgagttccaatgcgcacttgggcgctgtattcctcaacattggtattgtgatcaagaaacagattg
tttgatgcctctgatgaacctgcctcttgggtcactctgagcgaacatgcctagtgtgatgagttcaagtgtgatgggtgggag
gtgcatcccaagcgaatggatctgtgaoggtgataatgactgtggggatagatgagtgacgaggataaaaggcaccagtgta
gaatcaaaactgtcggattccgagtttctgtgtaaatgacagacctccggacaggaggtgcatccccagcttgggtct
gtgatggcgatgtggattgtactgacgggtacgatgagaatcagaattgcaccaggagaacttgccttgaatgaattcac
ctgtggttaccgactgtgtatccaaagatattcaggtgtgaccggcacaatgactgtggtgactatagcgacgagaggggc
tgcttataccagacttgccaacagaatcagttacctgtcagaacgggcgctgcattagtaaaaccttgcctgtgtgatgaggat
aatgactgtggagacggatctgatgagctgtgacactgtgccacacccccagaaccacgtgtccacctcacgagttcaag
tgtgacaatgggcgctgcatcgagatgatgaactctgcaaccacctagatgactgtttggacaacagcgatgagaaaggc
tgtggcattaatgaatgcatgaccttcaatcagtggtgtgcgacacactgcacagacaccttaaccagtttctattgttcc
gtcgtcctggttacaagctcatgtctgacaagcggacttgtgtgatattgatgaatgcacagagatgccttttctgttagcca
gaagtgtgagaatgaataggctcctacatctgtaagtgtccccagggtacctccgagaaccagatggaaagacctgccg
gcaaaacagtaacatcgaacctatctcatttttagcaaccgttactatttgagaaatttaactatagatggctatttttaccct
catcttggaaaggactggacaatgttgtggcattagattttgaccgagtagagaagagattgtattggattgatacacagaggc
aagtcatgtagagaatgttctgaataagacaaacaaggagacaataaaccacagactaccagctgcagaaagtctgg
ctgtagactgggtttccagaaagctctactgggtggatgcccgctggatggcctcttctctgacctcaatgggtggacacc
ggcgatgctggccagcactgtgtggatgccaaacacaccttctgcttggataatccagaggacttggccttcacctcaa
tatgggtacctctactgggcagactgggtgcaccgcgcatacattgggagagtaggcatggatggaaccaacaagtctgtg
ataatctccaccaagttagagtgccctaattggcatcaccattgattacaccaatgatctactctactgggcagatgccacctg
ggttacatagagtactctgatttggagggccaccatcgacacacgggtgtatgatggggcactgcctcacccttgcctattac
cattttgaagacactatttattggacagattggaatacaaggacagtggaagggaacaaatgatggatcaaatagac
agacactggtgaacacaacacacagaccatttgacatccatgtgtaccatccatataaggcagcccattggtgagcaatccct
gtggtaccaacaatgggtggctgttctcatctctgcctcatcaagccaggaggaaaagggttcacttgcgagtggtccagatga
cttccgcacccttcagctgagtggcagcacctactgcatgccatgtgtccagcaccagttctgtgcgctaacaatgaa

aagtgcattcctatctggtggaaatgtgatggacagaaagactgctcagatggctctgatgaactggcccttggccgcagc
gcttctgccgactgggacagttccagtgacgtgacggcaactgcaccagcccgcagactttatgcaatgctcacaaaattg
ccctgatgggtctgatgaagaccgtcttcttgtgagaatcaccactgtgactccaatgaatggcagtgcccaacaaacgtt
gcatcccagaatcctggcagtgtagacacatttaacgactgtgaggataactcagatgaagacagttcccactgtgccagcag
gacctgccggggccggccagttcgggtgtgctaattggcgtgcatcccgaggcctgggaagtgtgatgtggataatgattgt
ggagaccactcggatgagcccattgaagaatgcatgagctctgccatctctgtgacaacttcacagaattcagctgcaaaa
caaattaccgctgcatcccaaaagtgggcccgtgtgcaatgggtgtagatgactgcagggacaacagtgatgagcaaggctgtg
aggagaggacatgccatcctgtgggggatttccgtgtaaaaatcaccactgcatccctcttctgttggcagtgtagtgggca
aaatgactgtggagataactcagatgaggaaaactgtgctccccgggagtgacacagagagcaggttctgatgtgcaatca
gcagtgcatccctcgcgatggatctgtgaccattacaacgactgtggggacaactcagatgaacgggactgtgagatgag
gacctgccatcctgaatatcttcagtgtagaagtggacattgtgtacacagtgaaatgcaatgcgatggatccgctgactgtt
ggatgcgtctgatgaagctgattgtcccacacgcttctctgatgtgcatactgccaggctactatgttcgaatgcaaaaacc
atgtttgtatcccgccatattggaaatgtgatggcgatgatgactgtggcgatggttcagatgaagaacttcacctgtgcttgg
atgttccctgtaattcacaaaccgttccgggtgtgacaacaatcgtgcatattatagtcaggtgtgcaatgggtgtgagatga
ctgtggagatggaactgatgagacagaggagcactgtagaaaaccgaccctaaacctgtacagaatatgaatataagtgtg
tggaatgggcattgcattccacatgacaatgtgtgtgatgatgccgatgactgtgggtgactgttccgatgaactgggttgc
ataaaggaaaagaaagaacatgtgtgaaaatataatgcagcaaaattgtaccaatataatgaaggaggattatctgtctcc
tgtacagctgggttcgaaaccaatgttttgacagaacctcctgtctagatatcaatgaatgtgaacaattgggactgtcccc
agcactgcagaataacaaagggaagtgtgagtgctgtgctgatggcttcacgtctatgagtaccgcccctggaaaacg
atgtgcagctgagggtagctctccttctgtgactgctgacaatgtccgaattcgaaaataatctctcatctgagaggttct
cagagtatctcaagatgaggaatataccaagctgttgattatgattgggatcccaaggacataggcctcagtggtgtgatta
cactgtgcgagggggagggtcttaggttgggtgctatcaaacgtgcctacatcccaacttgaatccggccgcaataatctgt
tgcaggaagtgtacctgaaactgaaatcgtaatgcagccagatggaatagcagtgactgggttgggaaggcatatttactg
gtcagatgtcaagaataaacgcattgaggtggctaaactgtatggaaggtagaaggtggctgatttccactgacctggac
caaccagctgctattgtgtgaatccaaactagggttattgttctggactgactggggaaggaaacctaaaatcagactgtgc
ctggatgaatggagaggaccgcaacatcctgttttcgaggaccttgggtggccaactggccttctatcattatttgaacaa
tgaccgaatctactggagtgaactcaaggaggacgttattgaaaccataaaatatgatgggactgataggagagtcattgca
aagggaagcaatgaacccttacagcctggacatcttgaagaccagttatactggatatctaaggaaaagggaagatgg
aaacaaaataaatttgggcaaggaaagaaagagaaaacgctggtagtgaacccttggctcactcaagttcgaatcttctac
aactcagatacaataagtcagtcccaaccttgcgaacagatctgcagccacctctgccttctgagacctggagatacag
ctgtgcctgtccccaaagggtccagctttagaggggagcaccactgagtgtagtcagccatcgaactgcctatcaacctg
cccccccatgcaggtgatgcacggaggaaattgctattttagtagactgacctcccaaatgcaagtgtcctagcggct
acaccggaataattgtgaaatggcgttttcaaaaggcattctccagggaacaaccgcagtagctgtgtgtgtgacaatctc
ttgatcgtcgttaattggagctctggcaattgcaggattctccactatagaaggaccggctcccttctgctgtctgccaagc
tgccaagcttaagcagctctgtcaagccctctgaaaatgggaatggggtgaccttcagatcaggggcagatcttaacatgga
tattggagtgtctggttttgacctgagactgctattgacaggtcaatggcaatgggaagacttgcattggaatggggaag
cagcccataataattgaaaacccaatgtactcagccagagacagtgctgtcaagtgggtcagccaatccaggtgactgtatc
tgaaaatgtggataataagaattatggaagtcccataaaccctctgagatagttccagagacaaacccaacttcaccagctg
ctgatggaactcaggtgacaaaatggaatctcttcaaacgaaaatctaacaaaactaccaacttgaataatccaatctatgca
cagatggagaacgagcaaaaaggaaagtgtgtgogacaccacctccatcaccttcgctccctgctaagcctaagcctcctt
cgagaagagaccaactccaactattctgcaacagaagacactttaaagacaccgaaatctgttaaagaagactctga
agtatagtataccagctatttaggaataattagaacacactttgcacatatatttttacaacagatgaaaaagttaaca
ttcagttattatgaaaaaataatttttccctgtttgcctatagttggaggtatcctgtgtgtcttttttacttatgccgtctcatatt
tttacaataattatcacaatgtactatatgtatatcttgcactgaagttgtctgaaggtaataactataaatatattgtatattgtaa
atttggaaagattatcctgttactgaatttgcataaagatgtctgtgatttgggtggtgacattatagtaaatgatccaacaa
gaaaagggaattgactgggg

DEFINITION Homo sapiens low density lipoprotein receptor-related protein.3

(LRP3), mRNA.
ACCESSION XM 036573 SEQ ID NO:26
<p>Tacgggctgcaccgccaccgcacaaagacgcctcgggagccgccgcctgcacccggggccgcagcagccacgccag ccggagcccagaccctagcccagcccagcccagccgcagccagagccagagccggagccgcagccggaaccg gagccggagccgcggggcaggagggcgcccgccggcgccggccggccggccatggagaagcgccggccgggg gctggagggcgccggggcgccggcgccagctggccgtcgtctgtgtgaacatctttcaccgggagactcagc agtgcgggttcctgccttagcggcctgcagtgggaagctggagcagcacacggagcggcgtgggggtcatctacagcccg cctggcccctcaactaccgccagggcaccactgcagctgggtacatccagggcgaccgtgggtgacatgattaccatcagct tccgcaactttgacgtggaggagtcccaccagtgtccctggactggctcctgtggggccagcagccccaccccgccag gaggccttcgcctctgtggctccgccatcccacctgccttcacatctgtcccgcgaccatgtctggattttcttccactcagac gcctccagctccggccagggccagggcttcgtctgtttacatccaggggaagctggggccagggatcctgccaggcaga tgagttccgctgtgacaacggcaagtgcctgccggggcccggtggcagtgcaacacgggtggacgagtgtggagacggctct gatgaggggaactgctcggcgcccgcctccgagcctccagggcagcctgtgccccggggggaccttccatgcagcggg gcgcgctccacgcgtgcctgctgtggagcggcgctgtgacggcttcagggactgcggcgacggctcggatgagggcg ggctgccccgacctggcggtgcggcgccggcgctgggcagcttctacggctcctttgctccccagacctgttcggcgccgc tcggggccctcagaccttactgcagctgggtgggtggacacacaggactcccgcggggtgctgctgcagctggaactgc ggctgggctatgacgactacgtgcaggtatacagggcctggggcgagcgccggggaccgcctgtgcagacgctgtccta ccgcagcaaccaccggccgctgagcctggaggccgccagggcgccctcactgtggcctaccacgcgcgcggccgca gcgcggccacggcttcaatgccacctaccaggtgaagggtattgctccccgggagcagccgtgcggggagcagtag tgacagtacgggggagcctggggcaccagggctgcttctcagagccacagcgtgtgatggctgggtggcattgtgcca gcggccgagacgagcagggctgccctgcctgcccggccgaccagtaccctgcgaggggtggcagtggtctgtgtacac gcctgccgaccgctgcaacaaccagaaaagctgtcccgacggcgccgacgagaagaactgcttctcctgccagccggc accttccactgcggtaccaacctgtgcatcttcagacgtggcgctgtgacggccaggaagactgccaggacggcagcga tgagcatgggtgcctggccgcccgtgccccgcaaggtcatcacggcgccgctcattggcagcctgggtgtgtggcctgtgc tggtcatcgcgctgggtgcgccttcaagcttactactgcgcacgcaggaatacagggccttcgagaccagatgacgc gcctggaggctgagttcgtgcggcgggaggcaccctccatctatggtcagctcatcgccagggcctcattccaccggtg gaggacttctgtctacagtgcgtcccaggcctctgtgtgcagaatcttcgacagccatgcggagacagatgcgtcggc acgcctcccggcgggggccctcccgcggcgccctggccgctctggaaccggctctttaccggccgcggggcgcccc gaggccagatcccactgctgaccgcagcacgcccctcacagaccgtgctgggcgatggcttctccagcctgctccagg ggctgccccgacccccagcaccgctcatggacacaggcagcaccagggcgccgggagacaggccccccagtgccc ccggcctgacaccggaggtgggaccttcagggccacccttgccctgggcctgcgagaccagagtgcaggcccgtgg acaaggacagaaaggtgtcaggggagccactggttagacggccagctcctgcagatgcacctcgggagccctgctcag cccaggacccgcacccccaggtcctcactgccagcagcaccctggccccactcgcagagccactgggggtgtgca ggaacccccccccctgtcccaatgctggaggccagcgtgatgaggccctgttggtgtgtgaccgctgggctcg ctgggtgaccgccacagccccgctttgtaaccagggaatacacagtcattt</p>
DEFINITION Homo sapiens low density lipoprotein receptor-related protein 4
(LRP4), mRNA.
ACCESSION XM 035037 SEQ ID NO:27
<p>Caggcatgaacagtttctcatcttcgccaggaggatagacattgcagtggtctcctggacatcccttattttgctgatgtg tggtaccaatcaacattaccatgaagaacaccattgccattggagtagacccccaggaaggaaaggtgtactggtctgaca gcacactgcacaggatcagtcgtccaatctggatggctcacagcatgaggacatcatcaccacagggtacagaccaca gatgggctcgcggttgatgccattggccggaaggtatctggacagacacgggaacaaaccggattgaagtgggcaacct ggacgggtccatgcggaaggtgtgtgtggcagaaccttgacagtccccggccatcgactgtacctgagatggggtt tatgtactggacagactgggggggagaatgccaagtttagagcggctccggaatggatggctcagaccgcgggtgtcatca acaacaacctaggatggccaatggactgactgtggacaaggccagctcccaactgctatgggcccgatgccacaccga gcgaattgaggctgctgacctgaatggtgccaatcggcatacattggtgtaccgggtgcagcaccatattggcctcaccctg ctcgactcctatctactggactgactggcagactcggagcatccaccgtgctgacaagggtactggcagcaatgtcatcc</p>

tcgtgaggccaacctgccaggcctcatggacatgcaggctgtggaccgggcacagccactaggtttaacaagtgcggct
cgagaaatggcggtgctcccacctctgcttgcctggccttctggcttctcctgtgcctgccccactggcatccagctgaag
ggagatgggaagacctgtgatccctctcctgagacctacctgcttctccagccgtggctccatccggcgtatctactgga
caccagtaccacaccgatgtgatgtccctgttctcctgagctcaacaatgtcatctccctggactatgacagcgtggatgga
aaggtctattacacagatgtgtcctggatgttatcaggcgagcagacctgaacggcagcaacatggagacagtgatcggg
cgagggctgaagaccactgacgggctggcagtgactgggtggccaggaacctgtactggacagacacaggtcgaaat
accattgaggcgtccaggctggatgggtcctgccgcaaagtactgatcaacaatagcctggatgagccccgggccattgct
gtttccccaggaaggggtacctcttctggacagactggggccacattgccaagatcgaacgggcaaacttggatgggtctg
agcggaaggtcctcatcaacacagacctgggttggccaatggccttaccctggactatgataccgcaggatctactggg
tggatgogcatctggaccggatcgagagtgtgacctcaatgggaaactcgggcaggtcttggtcagccatgtgtcccacc
ccttggccctcacacagcaagacaggtggatctactggacagactggcagaccaagtcaatccagcgtgttgacaaatact
caggccggaacaaggagacagtgctggcaaatgtggaaggactcatggatcatcgtgtgttccctcagcggcagaca
gggaccaatgcctgtgtgtgaacaatgtgtgctgcacccacctctgcttggcagagcctcggacttcgtatgtcctgtcc
tgacgaacctgatagccggcctgctccctgtgcttggcctgttaccaccagctccttagggctactggcatgagtga
gagccagtgctacccaacacaccacctaccaccttgtattcttcaaccacccggacccgcacgtctctggaggaggtgga
aggaagatgctctgaaagggtatgccaggctgggcctctgtgcacgttccaatgacgctgttctgctgctccaggggaagg
acttcatactagctacgccattgggtgactcctcagtattctgctgatttgggtgattgcagctttagtctgtacagacaca
aaaaatccaagttcactgatcctggaatggggaacctcacctacagcaacccctcctaccgaacatccacacaggaagtga
agattgaagcaatcccaaacacagccatgtacaaccagctgtgtataagaagaggggagggcctgaccataactacacc
aaggagaagatcaagatcgtagagggaatctgcctcctgtctggggatgatgtgagtgggatgacctcaagcaactgcg
aagctcacgggggggctcctcctccgggatcatgtatgatgaagacagacacgggtgccatccaggccagctctggctccc
tggatgacacagagacggagcagctgttacaggaagagcagctctgagtgtagcagcgtccatactgcagccactccagaa
agacgaggctctctgccagacacgggctggaacatgaacgcaagctctcctcagagagccagggtctaaatgccacatt
cttctcctgcctgcctgttctctctcttattggacgtctagtctgtgctcgttacaccgcaggccccgcttctgtgtgcttg
tctcctcctcctccacccataactgttcttaagccttcaccggagctgttaccacgtgagtcataactacctgtgcaca
agaaatgatggcacatcacgagaatttagacctggatttaccatgaacctcacatctgtactccatcctgggccccctgaaa
ctgcttattctgtattcctaccagcgtagagctccacctcccccttccagtagccctcagtgctgcttctcagtgctgatgc
agctgatgaccaggactgcgctctgccccatcacagccagcatgactgcttctctgagagaacttgcccatcaggggctg
ggacatgggggtgtgggtaaagacagggtatgaaggatagaggctgagagaagaaggaagaatcagccagcaggtatg
ggcatctgggaaacctccagcctcaagtgtgttagtaacatgaaaaagccttgggggtagttggatctgggtgtctgtcca
ttgctggcagtggaattattcttgcctaaagacacactgcctttcagcagcagatactgggtgagatgggggtggctcaggc
tgttcttctcctcctagaatgtctggagctgttctacattcagataactgggtccctatcacaaggctactggctaataaggaa
ttccctcctggtgccaccactggccagctaccttcttaagcttctgctcaaatcaaccagggtgtgagccagtggttgagtga
tgttaggccttgggggctgagctctgaaaagtctaagaagctctgcctagaccaaatatggtatacctcctgacccctctctc
cctcatgtcctgggattctggggaagagacctagaacaagccttcaagaaaaaccagaagttgtcataaatgtgcagaaa
gaacgatcaggttgagacttgggaaaccagggcctaaagagaagtatccatgagggtcaaatctctgtgaacttccta
tgttcttctcaagtgtcagggatctaagttagtggacagcaagcctgtggctacgggggtggtgatgttctctccagctgtc
ccctcagctaaggggcttagttccatgtgggatgccatcacttgggtcatgctcattcacacaaagggcacgtgtctcagcct
ggatcagggaaattgagacttattttgcctaaaacgtctccctagctgttctcgtggggtttttgtttttgttcctaatt
gcttttctgaccaagccttgggcaccagcaatctcaaagctctgtgtgggagggctgaataaataaaaaatacaaaagag
gtgggtaaggagtaggaaggttagagagcaccactgatgaggccctcctagcccatggcagaccagacctcttcccccc
aggaattagaagtggcaggagagaacaacaggggctgggaatggaggggagaatttctaggggaagttcctgagttgaa
acttctcctgtggttactggtattgagaatcagctaccaagtgaaggaagacaagatcaattcttctagtcagttctaaga
ctgctagagagagataaccaggcccttagccttgcctcagtagcgtcagccccagttctgagcctccccacattacactaac
aagcagtaaggagtgagcacttgggtccttagactcacgtctggggaggaagagcaagtagaaaagtggcattttcttga
ttggaaagggggaaggatcttattgcacttgggtgttcagaatgtagaaaggacatatttgagggaagtatctatttgagcact
gatttactctgtaaaaagcaaaatctctgtcctaaactaatggaagcgattctcccatgctcatgtgtaattggtttaacgttac

tcactggagagattggactttctggagttatttaaccactatgttcagtattttaggactttatgataatttaataataaattagctttt
cttaatc

DEFINITION Homo sapiens low density lipoprotein receptor-related protein 5
(LRP5), mRNA.

ACCESSION NM 002335 SEQ ID NO:28

Atggagcccgagtgagcgcggcgccggccgtccggccgcgggacaacatggaggcagcgcggccgggcccgcg
tgcccgctgctgctgctgctgctgctgctggcgctgtgcggctgcccgcccccgccgcggcctcgccgctcctgcta
tttgccaaccgcccgggacgtacggctggtggacgccggcgagtgcaagctggagtcaccatcgtgtcagcggcctgg
aggatgcccgcagtgaggacttccagtttccaagggagccgtgtactggacagacgtgagcgaggaggccatcaagca
gacctacctaaccagacgggggcccgcgtgcagaacgtgtgcatctccggcctggctctcccgacggcctcgctgcg
actgggtgggcaagaagctgtactggacggactcagagaccaaccgcacgaggtggccaacctcaatggcacatccc
gaaggtgctcttctggcaggacctgaccagccgagggccatgccttggaccccgctcacgggtacatgtactggacag
actgggtgagacgccccggattgagcgggcagggatggatggcagcaccgggaagatcattgtggactcggacatta
ctggcccaatggactgacctgacctggaggagcagaagctctactgggtgacgccaagctcagcttcatccaccgtg
ccaacctggacggctcgttccggcagaaggtggtggaggcagcctgacgcaccccttcgccctgacgctctccgggga
cactctgtactggacagactggcagaccgctccatccatgcctgcaacaagcgactgggggggaagagggaaggagatc
ctgagtgccctctactacccatggacatccaggtgctgagccaggagcggcagcctttcttccacactcgctgtgaggag
gacaatggcggtgctctccacctgtgcctgctgtcccaagcgagcctttctacacatgcgcctgccccacgggtgtgacg
ctgcaggacaacggcaggacgtgtaaggcaggagccgaggaggtgctgctgctggcccgccggacggacctacggag
gatctcgtggacacgccggactttaccgacatcgtgctgacgtggacgacatccggcacgccaltgccatcgactacga
cccgttagagggtatgtctactggacagatgacgaggtgcggccatccgcagggcgctacctggacgggtctggggcg
cagacgctggtaaacaccgagatcaacgaccccgatggcatcgcggctgactgggtggccgaaacctctactggaccg
acacgggcacggaccgcacgaggtgacgcgcctaacggcacctcccgaagatcctggtgtcggaggacctggacg
agccccgagccatcgactgcaccccgatgggcctcatgtactggacagactggggagagaacctaaatcagatgt
gccaactggatgggcaggagcggcggtgtgctggtaacgctccctcgggtggcccaacggcctggccctggacctgc
aggaggggaagctctactggggagacgccaagacagacaagatcaggtgatcaatgttgatgggacgaagaggggga
ccctctctggaggacaagctcccgcacatttccgggttcacgctgctgggggacttcatctactggactgactggcagcgccg
cagcatcgagcgggtgcacaaggtcaaggccagccgggacgtcatcattgaccagctcccgcacctgatggggctcaaa
gtgtgtaatgtggccaaggtcgtcggaaaccaaccggtgtgcggacaggaacggggggtgcagccacctgtctcttcac
acccacgcaacccgggtgtggtgccccatcgccctggagctgctgagtgacatgaagacctgcacgtgcctgaggcct
tcttggtcttcaccagcagaccgccatccacaggatctccctcgagaccaataacaacgacgtggccatcccgtcacgg
gcgtcaaggaggcctcagccctggacttggatgtgtccaacaaccacatctactggacagacgtcagcctgaagaccatca
gccgcgccttcatgaacgggagctcgggtggagcacgtgggtggagtttggccttgactacccgagggcacgtggcgtgac
tgatggggaagaacctctactgggccgacactgggaccaacagaatcgaagtggcgcggctggacgggcagttccgg
caagtcctcgtgtggagggaacttgacaacccgaggtcgttggccctggatcccaccaagggtacatctactggaccga
gtggggcgccgaagccgaggatcgtgcgggccttcatggacgggaccaactgcatgacgctggtggacaaggtggggcg
ggccaacgacctaccattgactacgctgaccagcgctctactggaccgacctggacaccaacatgatcgagtcgtcca
acatgctgggtcaggagcgggtcgtgattgccgacgatctcccgcacccgttcggctgacgcagtacagcgattatatcta
ctggacagactggaatctgcacagcattgagcggggcgacaagactagcggccggaaccgcacctcatccaggggcca
cctggacttcgtgatggacatcctggtgttccactcctcccgccaggatggcctcaatgactgtatgcacaacaacgggcag
tgtgggcagctgtgccttgccatccccggcgccaccgctgcggctgcgcctcacactacacctggaccccgacgacc
gcaactgcagcccggccaccaccttctgtgttcagccagaatctgcatcagtcggatgatccggacgaccagcaca
ggccggatctcatctgcccctgcatggactgaggaaagcgtcaaagccatcgactatgacctggaagttcatctactg
ggtggatggggcgccagaacatcaagcgagccaaggacgacgggacccagcccttggtttgacctctctgagccaaggcc
aaaaccagacaggcagccccacgacctcagcatcgacatctacagccggacactgttctggacgtgcgaggccacca
taccatcaacgtccacaggctgagcggggaagccatgggggtggtgctgctggggaccgcgacaagcccaggggccat
cgctgcaacgcggagcgagggtacctgtacttccaacatgcaggaccggcgagccaagatcgaacgcgcagccctg

gacggcaccgagcgcgaggtcctctcaccaccggcctcatccgccctgtggccctggtggtagacaacacactgggca
agctgttctgggtggacgaggacgtgaagcgacgtgagagctgtgacctgtcaggggccaaccgctgacctggagga
cgccaacatcgtgcagcctctgggcctgaccatccttgcaagcatctctactggatcgaccgccagcagcagatgatcga
gcgtgtggagaagaccaccggggacaagcggactcgcaccagggccgtgtcggccacctactggcatcctatgcagt
gaggaagtcagcctggaggagttctcagcccaccatgtgcccgtgacaatggtggctgtcccacatctgtattgccaag
ggtgatgggacaccacggtgtcatgcccagtcacacctgtgtcctgcagaacctgtgacctgtggagagccgccac
ctgctccccggaccagtttgcattgtgcccaggggagatcactgtatccccggggcctggcgctgtgacggcttccga
gtgcgatgaccagagcgacgaggagggtgccccgtgtgtcggccgccagttccctgcgcgcggggtcagtgtgtg
gacctgcgcctgcgtgcgacggcgaggcagactgtcaggaccgtcagacgaggcgagctgtgacgccatctgcctgc
ccaaccagttccggtgtgcgagcggccagtggtgtcctcatcaaacagcagtgcgactccttccccgactgtatcgacggct
ccgacgagctcatgtgtgaatcaccaagccgccctcagacgacagcccggccacagcagtgccatcgggcccgctcat
tggcatcatctctctcttctgtcatgggtggtgtctatttgtgtgccagcgcgtggtgtgccagcgctatgcgggggcaa
cgggccccttccgcacgagatgtcagcgggaccccgacgtgcccctcaatttcatagccccgggcggttccagcatg
gccccttcacaggcatcgcagcggaaagtccatgatgagctccgtgagcctgatggggggcgggggcggggtgcccct
ctacgaccggaaccacgtcacaggggcctcgtccagcagctcgtccagcacgaaggccacgctgtacccgccgatcctg
aaccggccgcccctccccggccacggacccctcctgtacaacatggacatgttctactcttcaaacattccggccactgtga
gaccgtacaggccctacatcattcaggaatggcgccccgacgacgcccgtcagcaccgacgtgtgtgacagcgacta
cagcgccagccgctggaaggccagcaagtactacctggattgaactcggactcagacccctatccacccccaccacgc
cccacagccagctacgtgtcggcgaggacagctgcccgcctcgcggccaccgagaggagctacttccatctcttccc
ccccctcgtccccctgcacggactcatcctgacctcgccggggccactctggcttctgtgcccctgtaaatagtttaaat
atgaacaaagaaaaaataatttatgattaaaaataaataatgggattttaaaacatgagaaatgtgaactgtgatgg
ggtgggcagggtgaggagaactttgtacagtggacaataattataaacttaattttgtaaaacag

DEFINITION Homo sapiens low density lipoprotein receptor-related protein 6
(LRP6), Mrna.

ACCESSION NM_002336 SEQ ID NO:29

Gcggccgccccggctcctgcctccccacttctggccaccctcgccggtgagagaagagaacgcgagaagggaag
atggggggcgctcctgaggagcctcctggcctgcagcttctgtgtgctcctgagagcgggcccttctgtgttctatgcaaacag
acgggacttgcgattggttgatgtacaaatggcaaagagaatgtacgattgtattggaggcttggaggatgcagctgcg
gtggacttctgttttagtcattggttgatatactggagtgtatgcagcgaagaagccattaaacgaacagaatttaacaaaact
gagagtgtgcagaatgttgtgtttctggattattgtccccgatgggctggcatgtattggcttggagaaaaattgtactgga
cagattctgaaactaatcggattgaagtttctaatttagatggatctttacgaaaagttttatttggcaagagttggatcaacca
gagctattgccttagatccttcaagtgggttcatgtactggacagactgggggagaagtgcgaagatagaacgtgctggaat
ggatggttcaagtcgcttcattataataaacagtgaatttactggccaaatggactgacttggattatgaagaacaaaagctt
tattgggcagatgcaaaaacttaattcatccacaaatcaaatctggatggaacaaatcgccaggcagtggttaaagggttccctt
ccacatccttttgccttgacgttatttgaggacatattgtactggactgactggagcacacactccatttggcttgaacaagta
tactggtgagggtctgcgtgaaatccatttgacatcttctctccatggatatacatgccttcagccaacagaggcagccaa
atgccacaaatccatgtggaattgacaatgggggtgttccatttgtgttgatgtctccagtcaagccttttatcagtggtt
gccccactggggtcaaaactcctggagaatggaaaaacctgcaagatggtgccacagaattattgcttttagctcgaagga
cagacttgagacgcatcttcttgatacaccagattttacagacattgttctgcagttagaagacatccgtcatgccattgccat
agattacgatcctgtggaaggctacatctactggactgatgatgaagtggggccatagcccggttcatttatagatggatctg
gcagtcagtttgtgtcactgctcaaatgccatcctgatggtattgtgtgactgggttcacgaaatcttattggacaga
cactggcactgatcgaatagaagtacaaggctcaatgggaccatgaggaagatcttgatttcagaggacttagaggaacc
ccgggctattgttgatcccatggttgggtacatgtatggactgactggggagaaattccgaaaattgagcgagcagctc
tggatggttctgaccgtgtagtattggttaacacttctcttgggtggccaaatggttagccttggattatgatgaaggcaaaata
tactggggagatgcaaaaacagacaagattgaggttatgaatactgatggcactgggagacgagtactagtgaagacaa
aatcctcacatatttgatttacttgggtgactatgttactggactgactggcagaggcgtagcattgaaagagttcata
aacgaagtgcagagagggaagtgatcatagatcagctgcctgacctcatgggcctaaaggctacaaatgttcacgagtga

Tgctgctgctgctgctgctgctgctgcagctccagcatcttgcggcggcaggcggtgatccgctgctcggcggccaa
gggccggccaaggattgcgaagaaggaccaattccagtcccggaacgagcgtgcatccccctctgtgtggagatgcgacg

DEFINITION Homo sapiens porcupine (MG61), mRNA.

gggttgaggggaacacaatctgcaagccccgcgacccaagtgaggggccccgtgttggggctcctccctcccttgcattcc
 caccctccgggctttgctcttctggggacccctcgccgggagatggccgcttgatcgaggagcaaggattcgtcctg
 ctgctgtcctactggccgctgtgctggtggagagctcacagatcggcagttcgccggccaaactcaatccatcaa
 gtctctctgggaggagacgcctgtcaggccccaatcgatctcgggcatgtaccaaggactggcattcgccggc
 agtaagaaggggcaaaaacctggggcaggcctaccctttagcagtgataaggagtgtgaagttgggaggtattgccag
 tccccaccaaggatcatcgccctgcatggtgtgtcgagaaaaaagaagcgtgccaccgagatggcatgtgtgcccc
 gtaccctgtgcaataatggcatctgtatcccagttactgaaagcatcttaacccctcacatcccggtctgtggaagtactcg
 cacagagatcgaaaccacggcattactcaaacatgacttgggatggcagaatctaggaagaccacacactaagatgtca
 catataaaagggtatgaaggagacccctgcctacgatcatcagactgcattgaagggtttgtgtgtcgtcatttctggac
 caaatctgcaaacagtgctccatcagggggaagtctgtaccaacaacgcaagaagggttctcatgggctggaaatttc
 cagcgttgcgactgtgcaagggtctgttgcgaagtgtgaaagatgccactactcctccaaaggcagactccatgtgt
 gtcagaaaatttgatcaccattgaggaacatcatcaattgcagactgtgaagttgtgtatttaagcattatagcatggtggaaa
 ataagggtcagatgcagaagaatggctaaaataagaacgtgataagaatatagatgatcac

DEFINITION Homo sapiens dickkopf (Xenopus laevis) homolog 3 (DKK3), mRNA.

ACCESSION XM_006030 SEQ ID NO:34

Ctatcacaatgagaccaacacagacacgaaggttggaaataataccatccatgtgcaccgagaaattcacagataacca
 acaaccagactggacaaatggtctttcagagacagttatcacatctgtgggagacgaagaaggcagaaggagccacgag
 tgcacatcgacgaggactgtgggccagcatgtactgccagttgccagcttcagtacacctgccagccatgccggggc
 cagaggatgctctgacccgggacagtgtgtgtggagaccagctgtgtgtctggggtactgcacaaaatggccac
 caggggcagcaatgggacctctgtgacaaccagaggagctgccagccggggctgtgtgtgccttcagagaggcctg
 ctgttccctgtgtgcacaccctgccgtggaggggcagcttggcatgacccgccagccggcttctggacctcatcact
 gggagctagagcctgatggagccttgaccgatgccctgtgccagtggcctcctctgccagccccacagccacagcctg
 gtgtatgtgtgcaagccgacctctgtggggagccgtgaccaagatggggagatcctgctgccagagagggtcccgatga
 gtatgaagttggcagcttcatggaggaggtgcgccaggagctggaggacctggagaggagcctgactgaagagatggcg
 ctgggggagcctgcggctgccgccgctgactgtgtggagggggaagagatttagatctggaccaggctgtgggttagatgt
 gcaatagaaatagctaatttattccccaggtgtgtgtttaggcgtgggctgaccaggcttcttctacatcttctccagtaa
 gtttccctctggttgacagcatgaggtgtgtgtcattgttcagctccccaggtgttctccaggttcacagtctgtgtgt
 gggagagtcaggcagggttaaactgcaggagcagtttgcacccctgtccagattattggtgcttgcctctaccagtgg
 cagacagccgttgttctacatggcttggataattgtttgaggggaggagatggaaacaatgtggagtctccctctgattggtt
 tggggaaatgtggagaagagtgccttgcttgcacaacatcaacctggcaaaaatgaacaatgaattttccacgcagttctt
 tccatgggcataggttaagctgtgccttcagctgttcagatgaaatgttctgttcacctgcattacatgtgttattcatccagc
 agtgttgcagctcctacctctgtgccagggcagcatttcatatccaagatcaattccctctctcagcacagcctggggagg
 gggcattgttctcctgtccatcagggatctcagaggntcagagactgcaagctgcttggccaagtacacagctagtga
 agaccagagcagtttcatctggttgtacttaagctcagtgctctctccactacccacaccagccttgggtgccacaaaag
 tgctccccaaaaggagaagatgggattttctttgaggcatgcacatctggaattaaaggtcaaaactaattctcacatccct
 ctaaaagttaaactactgttaggaacagcagtggttctcacagtgtggggcagccgtccttctaatgaagacaatgatattgaca
 ctgtccctcttggcagttgcattagtaactttgaaaggtatatgactgagcgtagcatacaggttaacctgcagaaacagtact
 taggtaatttagggcgaggattataaatgaaattgcaaaatcacttagcagcaactgaagacaattatcaaccacgtggag
 aaaatcaaaccgagcagggtgtgtgaaacatggttgtaatatgcgactgcgaacactgaactctacgccactccacaaat
 gatgtttcagggtgtcatggactgttgcaccatgtattcatccagagttcttaagtttaagttgcacatgattgtataagcatg
 ctttctttgagtttaaatatgtataaacataagttgcatttagaaatcaagcataaatcac

DEFINITION Homo sapiens dickkopf (Xenopus laevis) homolog 4 (DKK4), mRNA.

ACCESSION XM_032444 SEQ ID NO:35

Agacgacgtgctgagctgccagcttagtggagctctgctctgggtggagagcagcctcgtttggtgacgcacagtgt
 gggaccctccaggagccccgggattgaaggatggtggcggcgtcctgctggggctgagctggctctgtctccctggg
 agctctgtcctggacttcaacaacatcaggagctctgctgacctgcatggggccggagggtcacagtgcctgtctga
 cacggactgcaataaccagaaagtctgcctccagccccgcgatgagaagccgttctgtgtacatgtcgtgggttgcggag

gaggtgccagcgagatgcatgtgctgccctgggacactctgtgtgaacgatgtttgtactacgatggaagatgcaacccc
aatattagaaaggcagcttgatgagcaagatggcacacatgcagaaggaacaactgggcacccagtcaggaaaaccaa
cccaaaaggaagccaagtattaagaatcacaaaggcaggaaggggacaagagggagaaagtgtctgagaacttttgactg
tggccctggactttgctgtgctcgtcattttggacgaaaattgttaagccagtcctttggagggacaggtctgtccagaag
agggcataaagacactgctcaagctccagaaatctccagcgttgcgactgtggccctggactactgtgtcgaagccaattg
accagcaatcggcagcatgctcgattaagagtatgccccaaaaatagaaaagctataaatatttcaaaataaagaagaatcca
cattgc

DEFINITION Human Frizzled related protein Frzb precursor (fzrb) mRNA,
complete cds

ACCESSION U24163 SEQ ID NO:36

Acggggcctggcggsagggcggtggctggagctcggtaaagctcgtgggacccattgggggaatttgatccaagg
aagcgggtgattgccgggggaggagaagctccagatcctgtgtccactgcagcgggggaggcggagacgcggagcg
ggccttttggcgtccactgcgcgggtgcacctgccccatctgcgggatcatggctgtcggcagcccgaggaggtgc
tgtgtgtcggggccgggctgcttgcctggctgtctctgcctgtccgggtgcccggggctcgggctgcagcctgtgagc
ccgtccgcacccccctgtgcaagtccctgccctggaacatgactaagatgccaaccacctgcaccacagcactcaggcc
aacgccatctggccatcagcagttcgaaggtctgtgggcacccactgcagccccgatctgtcttcttctctgtgccat
gtacgcgccatctgcaccattgacttccagcacagcccatcaacccctgtaagtctgtgtgcagcgggcccggcagg
gctgtgagccatactcatcaagtaccgccactcgtggccggagaacctggcctgcgaggagctgccagtgacgacagg
ggcgtgtgcatctctcccaggccatcgttactgcggacggagctgatttctatggattctagtaacggaaactgtagagg
ggcaagcagtgaaagctgtaaatgtaagcctattagagctacacagaagacatttccggaacaattacaactatgtcattc
gggctaaagttaaagagataaagactaagtccatgatgtgactgcagtagtgagggtgaaggagattctaaagtcctctct
ggtaaacattccacgggacactgtcaacctctataccagctctggctgcctctgccctccacttaattgtaagtaggaatata
catcatgggctatgaagatgaggaacgttcagattactcttgggtggaaggctctatagctgagaagtgaaggatcgactc
ggtaaaaaagtgtaagcgtgggatatgaagcttcgtcatttggactcagtaaaagtgtattctagcaatagtattccactcag
agtcagaagtctggcaggaactcgaacccccggcaagcacgcaactaaatcccgaatacaaaaagtaacacagtggac
ttctattaagacttacttgcattgtgactagcaaaaggaaaattgcactattgcacatcatattctattgtttactataaaaatca
tgtgataactgattattacttctgtttcttttggtttctgttctctctctcaaccccttgtaatggttgggggcagactotta
agtatatgtgagttttctatttactaatcatgagaaaaactgttcttttgaataataataaataaacatgctgtta

DEFINITION Homo sapiens secreted apoptosis related protein 1 (SARP1) mRNA,
partial cds.

ACCESSION AF017986 SEQ ID NO:37

Gaattcgttcagcctggtaagtccaagctggctcattctgtccccgggtcggagccccccggagctgcgcgcgggctt
gcagcgcctcgcgcgcgtgtcctcccgtgtcccgttctccgcgccccagccgccgggtgccagcttttggggcccc
gagtcgcacccagcgaagagagcggggcccggaagctcgaactccggccgcctcgccttaaccagctccgtccct
ctacccccctaggggtcgcgcgccacgatgctgcagggccctggctcgtgtgtgtgtcttctcgcctcgcactgtgctgctg
ggctcggcgcgcgggctcttctctttggccagcccacttctctacaagcgcagcaattgcaagcccatcccgccaac
ctgcagctgtgccacggcatcgaataaccagaacatgcggctgcccacactgctgggcccagagaccatgaaggaggtgc
tggagcagggccggcgttggatcccgtgtgcatgaagcagtgccacccggacaccaagaagttcctgtgtcgtcttctc
ccccgtctgctcgtatgacgtagacgagaccatccagccatgccactctcgtgtcgtgcaggtgaaggatcgctgcgcc
ccgggtcatgtccgccttcccctggccgacatgcttgagtgcgaccgttccccaggacaacgacctttgcatccccctcg
ctagcagcgaccacctcctgccagccaccgaggaagctccaaaggtatgtgaagcctgcaaaaataaaaatgatgatgac
aacgacataatgaaacgctttgtaaaaatgatttgcactgaaaaataaaagtgaaggagataacctacatcaaccgt

Cytoplasmic acting components:

DEFINITION Homo sapiens adenomatosis polyposis coli (APC), mRNA.

ACCESSION XM_043933 SEQ ID NO:38

Aggtccaagggtagccaaggatggctgcagcttcatatgatcagttgttaaagcaagttgaggcactgaagatggagaact

caaatcttcgacaagagctagaagataattccaatcatcttacaaaactggaaactgagcatctaataigaaggaagtactt
aaacaactacaagggaagtattgaagatgaagctatggcttctctggacagattgatttattagagcgtcttaaagagcttaact
tagatagcagtaatttccctggagtaaaactgcggtcaaaaatgtccctcgttcttatggaagccgggaaggatctgtatca
agccgttctggagagtgagctcctgttccctatgggttcatttccaagaagagggtttgtaaatggaagcagagaaaagtactgg
atatttagaagaacttgagaagagaggtcattgcttctgctgatcttgacaagaagaaaaggaaaaagactggattacg
ctcaactcagaatctcactaaaagaatagatagcttcttactgaaaatttttcttacaaacagatatgaccagaaggca
attggaatatgaagcaaggcaaatcagagttgcgatggaagaacaactaggtacctgccaggatatggaanaacgagcac
agcgaagaatagccagaattcagcaaatcgaaggacatacttctgtatcagacagcttttacagtcccaagcaacagaag
cagagaggtcatctcagaacaagcatgaaaccggctcacatgatgctgagcggcagaatgaagggtcaaggagtgggaga
aatcaacatggcaacttctgtgaatggcaggggtcaactacagaaatggaccatgaaacagccagtgttttgagtctagta
gcacacactctgcacctcgaaggctgacaagtcatctgggaaccaagggtggaatggtgtattcattgttgcataactgtgt
actcatgataaggatgatgtgcgaactttgctagctatgtctagctcccaagacagctgtatatccatgcgacagctgtgga
tgtcttctctctcatccagcttttacatggcaatgacaaaagactctgtattgttgggaaattcccggggcagtaaaagggtc
gggcccaggccagtgacgacacccacaacatcattcactcacagcctgatgacaagagagggcagggcgtgaaatccgagt
cttctcatcttttgaacagatacgcgttactgtgaaacctgttgggagtggcaggaagctcatgaaccaggcatggaccag
gacaaaaatccaatgccagctcctgttgaacatcagatctgtcctgctgtgtgttctaatgaaactttcatttgatgaagagc
atagacatgcaatgaatgaactaggggactacaggccattgcagaattattgcaagtggactgtgaaatgtatgggcttact
aatgaccactacagtattacactaagacgatagctggaatggcttgacaaacttgacttttgagatgtagccaacaaggct
acgctatgctctatgaaaggctgcatgagagcactgttggcccaactaaaatctgaaagtgaagacttacagcaggttattgc
gagtggtttgaggaattgtcttggcgagcagatgtaaatagtaaaaagacgttgcgagaagttggaagtgtgaaagcattga
tggaatgtctttagaagttaaaaaggaatcaacctcaaaagcgattgagtgccctatggaattgtcagcacattgcactg
agaataaagctgatatatgtctgtagatgggtgcacttgcattttgggtggcacttacttaccggagccagacaaacttt
agccattattgaaagtggaggtgggatattacggaatgtgtccagcttgatagctacaaatgaggaccacaggcaaatccta
agagagaacaactgtctacaaactttattacaacacttaaaatctcatagttgacaatagtcagtaatgcatgtggaactttgtg
gaatctctcagcaagaaatcctaaagaccaggaagcattatgggacatgggggcagttagcatgtcagaacctcattcat
tcaaagcacaanaatgattgctatgggaagtgtgcagctttaaggaatctcatggcaaataggcctgcgaagtacaaggatg
ccaatattatgtctcctggctcaagcttgccatctctcatgttaggaaacaaaaagccctagaagcagaattagatgtcagc
acttatcagaacttttgacaatatagacaatttaagtccaaggcatctcatcgtagtaagcagagacacaagcaaaagtctct
atggtgattatgttttgacaccaatcgacatgatgataataggtcagacaattttaatactggcaacatgactgtcctttccat
attgaatactacagtgttaccagctcctctcatcaagaggaagcttagatagttctcgttctgaaaaagatagaagtttga
gagagaacgcggaattgttctaggaactaccatccagcaacagaaaatccaggaacttcttcaaagcgaggtttgcagat
ctccaccactgcagcccagattgccaagtcaggaagaagtgtcagccattcatacctctcaggaagacagaagttctgg
gtctaccactgaattacattgtgtgacagatgagagaatgcacttagaagaagctctgtgcccatacacattcaaacattta
caatttactaagtcggaaaattcaaataggacatgttctatgccttatgccaattagaatacaagagatcttcaaatgatagtt
taaatagtgtagtagtagtgatggttatggtaaaagaggtcaaatgaaacctcgtattgaatcctattctgaagatgatgaaa
gtaagttttgcagttatggtcaataccagccgacctagccataaaaatacatagtgcgaatcatatggatgataatgatggag
aactagatacaccaataaattatagcttaaatattcagatgagcagttgaactctggaaggcaaaagtccttcacagaatgaa
gatgggcaagacccaacacataatagaagatgaataaaacaaagtgcgaagacaatcaaggaatcaaggtacaact
tatctgtttatactgagagcactgatgataaacacctcaagttccaaccacattttggacagcaggaatgtgtttctccataca
ggtcacggggagccaatggttcagaacaaatcagtggttctaatcatggaattaatcaaaatgtaagccagctttgtgt
caagaagatgactatgaagatgataagcctaccaattatagtgaaagttactctgaagaagaacagcatgaagaagaagag
agaccaacaaattatagcataaaatataatgaagagaaacgtcatgttgatcagcctattgattatagtttaaatatgccaca
gatattcctcatcacagaacagtcattttcattctcaaagagttcatctggacaaagcagtaaaaccgaacatatgtctcaa
gcagtgcagaatacgtccacaccttcatctaatgccaagaggcagaatcagctccatccaagttctgcacagagtgaagtg
gtcagcctcaaaaggctgccacttgcaaaagtttcttataaccaagaacatacagacttattgtgtagaagatactccaat
atgttttcaagatgtagttcattatcatcttgcacagctgaagatgaaataggatgtaatcagacgacacaggaagcagat
ctgtctaataccctgcaaatagcagaataaaaagaaaagattggaactaggtcagctgaagatcctgtgagcgaagttccag

cagtgtcacagcaccctagaaccaaatccagcagactgcagggttctagtttatcttcagaatcagccaggcacaagctgt
tgaattttcttcaggagcgaaatctccctccaaaagtgggtcgtcagacacccaaaagtccacctgaacactatgttcaggaga
ccccactcatgttttagcagatgtacttctgtcagttcacttgatagttttgagagtcgttcgattgccagctccgttcagagtga
ccatgcagtggaatggtaagtggcattataagccccagtgatcttcagatagccctggacaaacctatgccaccaagcaga
agtaaacacctccaccacctctcaaacagctcaaaccaagcgagaagtagctaaaaataaagcacctactgtgaaaag
agagagagtgagcctaagcaagctgcagtaaatgctgcagttcagagggtccaggttcttcagatgtgatactttattaca
ttttgccacggaaagtactccagatggattttctgttcacccagcctgagtgctctgagcctgatgagccatttatacagaaa
gatgtggaattaagaataatgcctccagttcaggaaaatgacaatgggaatgaaacagaatcagagcagcctaaagaatca
aatgaaaaccaagagaaagaggcagaaaaaactattgattctgaaaaggacatttagatgattcagatgatgatattga
aatactagaagaatgtattttctgccatgccaacaaagtcacgtaaagcaaaaaagccagcccagactgcttcaaat
tacctccacctgtggcaaggaaaccaagtcagctgcctgtgtacaaacttctaccatcacaaaacaggttgcaacccccaaa
gcattgttagttttacaccgggggatgatatgccacgggtgtattgtgtgaaggacacctataaactttccacagctacatct
ctaagtgatcaacaatgaatccctccaaatgagttagctgctggagaaggagtttagaggaggggacagtcaggtgaa
ttgaaaaacagataaccattcctacagaaggcagaagtagatgaggtcaaggaggaaaaacctcatctgtaaccata
cctgaattggatgacaataaagcagaggaagggtgatattctgcagaatgcattaattctgctatgccaaaagggaaaagtca
caagcctttccgtgtgaaaaagataatggaccaggtccagcaagcatctgcgtcttctctgcaccaacaaaaatcagttag
atggtaagaaaaagaaaccaacttcaccagtaaaacctataccacaaaaatactgaatataggacacgtgtaagaaaaaatg
cagactcaaaaaataatttaaatgctgagagagttttctcagacaacaagattcaagaaacagaattgaaaaataattcca
aggcttcaatgataagctcccaataatgaagatagagtcagaggaagtttgcttttgattcacctcatcattacacgcctatt
gaaggaactccttactgttttcacgaaatgattctttgagttctctagattttgatgatgatgttgacctttccagggaaaag
gctgaattaagaaaggcaaaaagaaataaggaatcagagggttaaggtaccagccacacagaactaacctccaaccaaca
atcagctaataagacacaagctattgcaaagcagccaataaatcagaggtcagcctaaccatacttcagaacaatccact
ttccccagtcattcaaaagacataccagacagagggggcagcaactgatgaaaagttacagaatttgctattgaaaatactcc
ggtttgctttctcataattcctctctgagttctctcagtgacattgaccaagaaaacaacaataaagaaaatgaacstatcaa
gagactgagccccctgactcacaggggagaaccaagtaaacctcaagcatcaggctatgctcctaaatcatttcattgtgaag
atccccagtttgtttcaagaaacagttctctcagttctcttagtattgactctgaagatgacctgttcaggaatgtataagct
ccgcaatgccaaaaaagaaaaagccttcaagactcaagggtgataatgaaaaacatagtcagaaatattgggtggcataat
taggtgaagatctgacacttgattgaaagatatacagagaccagattcagaacatggctctatcccctgattcagaaaatttg
attgaaagctatcaggaagggtgcaattccatagtaagtagttacatcaagctgctgctgctgcatgtttatctagacaagc
ttcgtctgattcagattccatcctttccctgaaatcaggaatctctctgggatcaccatttcattctacacctgatcaagaagaaa
aaccttttacaagtaataaaggccacgaattctaaaaccagggggagaaaagtacattggaaactaaaaagatagaatctg
aaagtaaaaggaatcaaaggaggaaaaaaagttataaaagtttgattactggaaaagttcgaatcattcagaatttcaggc
caaatgaacagccccctcaagcaaacatgccttcaatctctcagggcaggacaatgattcatattccaggagttcgaaatag
ctcctcaagtagcaagtcctgtttctaaaaaaggcccccccttaagactccagcctccaaaagccctagtgaaaggtcaaaca
gccaccacttctcctagaggagccaagccatctgtgaaatcagaattaagccctgttgccaggcagacatcccaaatagggt
gggtcaagtaaaagcaccttctagatcaggatctagagattcgacccctcaagacctgccagcaaccattaagtagacctta
tacagttctcctggccgaaactcaatttcccctggtagaatggaataagtcctcctaacaattatctcaacttcaaggacat
catcccctagttactgcttcaactaagtcctcaggttctggaaaaatgtcatatacatctccaggtagacagatgagccaacag
aaccttaccacaacaaacaggtttatccaagaatgccagtagtattccaagaagtgaagtctgcctccaaaggactaaatcagat
gaataatggtaatggagccaataaaaaaggtagaactttctagaatgtcttcaactaaatcaagtggaaagtgaatctgatagatc
agaaagacctgtatttagtaccagtcacttcatcaaaagagctccaagcccaaccttaagaagaaaattggaggaaatct
gcttcatttgaatctcttttccatcatctagaccagcttctccactaggtcccaggcacaacactccagtttaagtccttccctt
cctgatattgtctatccacacattcgtctgttcaggctgggtggatggcgaaaaactcccacctaatctcagtcacctatagagt
ataatgatggaaagaccagcaaaagcgccatgatattgcacgggtctcattctgaaagtccttctagacttcaatcaatagggtca
ggaacctggaaacgtgagcacagcaaacattcatctccttctcagtaagcacttgagagaagaactggaagttcatctt
caattctttctgttcacagaatccagtgaaaaagcaaaaagtggagatgaaaaacatgtgaactctatttcaggaacaaaa
caaagtaaaagaaaaccaagtatccgcaaaaaggaacatggagaaaaataaaagaaaatgaattttctccacaaatagtactt

ctcagaccgttctcaggtgctacaaatgggtgctgaatcaaagactctaatttatcaaatggcacctgctgtttctaaacaga
 ggatgtttgggtgagaattgaggactgtccattacaatcctagatctggaagatctccacaggaataactccccgggtga
 ttgacagtgtttcagaaaaggcaaatccaaacattaaagattcaaaagataatcaggcaaaacaaaatgtgggaatggcag
 tgttccatgctgaccgtgggttggaaaatgcctgaactcctttatcaggtggatgcccctgacaaaaaggaactgaga
 taaaaccaggacaaaataatcctgtccctgtatcagagactaatgaaagtctatagtgaacgtacccccattcagttctagca
 gctcaagcaaacacagttcacctagtgggactgttgctgccagagtactccttttaattacaacccaagccctaggaaaag
 cagcgcagatagcacttcagctcggccatctcagatcccaactccagtgataacaacacaaaagaagcgagattccaaaa
 ctgacagcacagaatccagtggaacccaaagtctaagcgccattctgggtcttaccttgtagatctgtttaaaagagagg
 aagaatgaaactaagaaaattctatgttaattacaactgctatatagacattttgtttcaaatgaaactttaaaagactgaaaaat
 ttgtaaatagggttgattctgttagagggttttgttctggaagccatatttgatagtatactttgtcttactggtcttattttggga
 ggcaactcttgatggttaggaaaaaatagtaaagccaagtatgtttgtacagtatgtttacatgtatttaaagtagcatcccatc
 ccaacttcttttaattattgcttgtcttaaaataatgaacactacagatagaaaaatgatattgtctgttatcaatcattcttagat
 tataaactgactaaacttacatcagggaaaaattggtatttatgcaaaaaaaatgtttgtccttgtagtccatctaacatcat
 aattaatcatgttggtgtgaaattcacagtaatatggttcccgatgaacaagttaccagcctgctttgctttactgcatgaatg
 aaactgatggttcaatttcagaagtaattgattaacagttatgtgggtcacatgatgtgcatagagatagctacagtgaataattta
 cactattttgtgctccaaacaaaacaaaatctgtgaactgtaaaacattgaatgaaactattttacctaactagattttatctg
 aaagtaggtagaattttgtctatgtgtaattgtgtatattctggtatttgagggtgagatggctgctcttttataatgagacatga
 attgtgtctcaacagaaactaaatgaacatttcagaataaattattgtgtatgtaactgttactgaaattggtattgtttgaagg
 gtcttgtttcacattgtattaataattgtttaaaatgcctcttttaaagcttatataaattttttcttcagctctatgcattaagagta
 aaattcctcttactgtaataaaaacaattgaagaagactgttgccacttaaccattccatgcgttggcacttatctattctgaaat
 ttctttatgtgattagctcatcttgattttaatttttccacttaaaacttttttcttactccactggagctcagtaaaagtaaatca
 tgaatagcaatgcaagcagcctagcacagactaagcattgagcataataggcccacataatttctcttcttaattatagata
 attctgtacttgaaattgattcttagacattgcagctctctcagggctttacagtgtaaactgtcttccccctcatcttctgttga
 actgggtctgacatgaacacttttatccctgtatgttagggcaagatctcagcagtgaaagtataatcagcactttgccatgc
 tcagaaaattcaaatcacatggaacttttagaggttagatttaatacagattaagatatcagaagtataatttagaatccctgcctgtt
 aaggaaactttattgtggttaggtacagttctgggtacatgtaagtgtcccttatacagtggagggaagcttctcctctga
 aggaaaataaactgacacttattaactaagataatttacttaatatcttccctgattgttttaaaagatcagagggtgactgat
 gatacatgcatacatattgttgaataaatgaaaattatttttagtgataagattcatacactctgtattggggaggggaaaacctt
 ttaagcatgggtggggcactcagataggagtgaatacacctacactgggtg

DEFINITION Homo-sapiens axin (AXIN1), mRNA.

ACCESSION XM 027520 SEQ ID NO:39

Gggccgggggtcccgccaccacogcgcgcgggacagattgattcactttggagctgtaagtactgatgtattagggtgca
 gcgctcattgttcttgacgcagaggtcccaaatgaatatccaagagcaggggttcccttggacctcggagcaagttacc
 gaagatgctccccgacccccagtgctgtgaggaggaggaactggtgtccacagaccgaggcccgcagctacagtt
 tctgtctcgggaaaggtgttgccattaaaggtgagacttcgacggccactccgaggcgctcggatctggacctggggtatg
 agcctgaggggcagtgctccccaccaccatactgaagtgggctgagtcactgcattccctgctggatgaccaagatg
 ggataagcctgttcaggactttcctgaagcaggagggtgtgccgactgtctggacttctggttgcctgcactggcttcagg
 aagctggagccctgtgactcgaacgaggagaagaggctgaagctggcgagagccatctaccgaaagtacattcttgataa
 caatggcatcgtgtccggcagaccaagccagccaccaagagcttcataaagggtgcacatgaagcagctgatcgcac
 ctgccatgttgaccaggcccagaccgaaatccaggccactatggaggaaaacacctatccctccttctaagtctgatatt
 atttggaatatacaggagcagggtcggagagccccaaagtctgtagtaccagagctctgggtcagggacagggaaggg
 catatctggatacctgccgaccttaaatgaagatgaggaatggaagtgtgaccaggacatggatgaggacgatggcagag
 acgctgtccccccggaagactccctcagaagctgtcctggagacagctccccgagggtctcctccagtagacggtac
 agegaaggcagagagttcaggtatggatcctggcgggagccagtcacccctattatgtcaatgccggctatgccctggcc
 ccagccaccagtccaacgacagcgagcagcagagcctgtccagcgatgcagacaccctgtccctcacggacagcagc
 gtggatgggatcccccatagcatccgtaagcagcaccgcaggagatgcaggagagcgtgcagggtcaatgggagg
 gtgcccctacctcacattcccgttaagtaccgggtgccgaaggaggtccgcgtggagcctcagaagttcggcgaggagctc

atccaccgcctggaggctgtgcagcgcacgcgggaggccgaggagaagctggaggagcggctgaagcgcgtgcgc
 ggaggaggaaggtgaggacggcgatccatcgtcagggcccccaggccgtgtcacaagctgcctcccgccccgcttg
 gcaccacttcccgccccgctgtgtggacatgggctgtgccgggctccgggatgcacacgaggagaacctgagagcatc
 ctggacgagcactacagcgtgtgctgaggacacctggccgccagtcgcctgggcctggccatcgtcccgagacagt
 ggcacgtggccaagatgccagtggcactggggggtgccgctcggggcacgggaagcacgtacccaagtcaggggcg
 aagctggacgcggccggcctgcaccaccaccgacacgtccaccaccagtcaccacagcacagcccggcccaagga
 gcaggtggaggccgaggccacccgcaggggccagagcagcttcgcctggggcctggaaccacacagccatggggcaa
 ggtcccagggtactcagagagtgttgccgctgccccaacgccagtgtggcctcggccacagtgggaaggtgggcgt
 ggcgtgcaaaagaaatgccaaaggctgagtcggggaagagcggcagcaccgaggtgccaggtgcctcggaggatg
 cggagaagaaccagaaaatcatgagtgatcattgaggggaaaaggagatcagcaggcaccgcaggaccggccac
 gggcttctggggacgaggaagccacagccccatgagaactccagacccctgtcccttgagcacccttggggccggcctc
 agtcccgacctccgtgcagccctccacctcttcatccaagacccccaccatgccacccccaccagctcccaacccctaa
 cccagctggaggaggcgcgccgacgtctggaggaggaagaaaagagagccagccgagcaccctccaagcagaggtat
 gtgcaggaggttatcgggcggggacgcgcctgctcaggccagcgtgcgcggcggtgctgcacgtggtaccagccgtg
 cggacatggagctctccgagacagagacaagatgcagagggaaggtggggggcgggagtgccagccgtgtgacagc
 atcgttgtggcgtactacttctgcggggaacccatccctaccgcaccctgggtgagggggccgcgctgtcacctgggcccag
 ttaaggagctgctgacaaaaaggcagctacagatacttcaagaaagtgcgcgacgagtttactgtgggggtgtg
 tttgaggaggttcgagaggacgaggccgtcctgccgtctttgaggagaagatcatcgcaagtggagaaggtggactg
 ataggctgggtgggctggccgctgtgccaggcgaggcccttggcgggcacgggtgtcacggccaggcagatgacctgta
 ctcaggagcccgatggggaacagtgttgggtgtaccacccatccctgtggtctaccctgtctagaggcaggtagggggtc
 cctccaagtgtccacaagcttctgtcctgcccccaaggaggcagcctggaccactcctcatagcaatacttgaggggccc
 agcccaagtggagcagccgaggtccctgctgccagcttcaggtgaccccccccatccccggcacctcccttgggcac
 gtgtgctgggatctacttccctctgggatttggccacgtaccaggtctgggtggggcccaggcccggatgcagaggcct
 gcagggcctctgtcaattgtacgcgccaccgagtgcttcaacacagcttgccttgcctgccactgtgtgaatcggcgac
 ggagcactgcacctgcctccagccgccggctgtgcagtcctgggtcctccttctgaggggccgtgtaaatatgtacattct
 caggctaggccagcaggggctgcccgagctgttttcatgcgatgacactgtacaattaattatctttcaaaggtacttggga
 taataatgaaataaaactgttttgaacctg

DEFINITION Homo sapiens AXIN2 (AXIN2) mRNA, complete cds.

ACCESSION AF205888 SEQ ID NO:40

Gttcagatgagccctgctgacttgagagagacagagagaccacgccgattgctgagaggaaactggaagaagaagagat
 tocagactcagtgagggaagagctccctaccatgagtagcgctatgttggtgacttgctcccgaccacccagcagcagctc
 cgtgaggatgccccgcggccccagtgccagggggaagaggggagacccaccgtgtcaccatggtgggcaaggggcc
 aggtcacaaacccatgtctgtcttccaacaccaggcggaacgaagatgggttggggagccggaggggcccggcatct
 ccggattccctctgacccgggtggaccaagtccttacactccttattgggcgatcaagacgggtgcttacctgttccgaacttc
 ctggagaggggagaaatgcgtggataccttagacttctggttgctgcaatggattcaggcagatgaacctgaaggatacca
 aaactttacgagtagccaaagcgatctacaaaaggtaacattgagaacaacagcattgtctccaagcagctgaagcctgcca
 ccaagacctacataagagatggcatcaagaagcagcagattgattccatcatgttgaccaggcgcagaccgagatccagt
 cgggtgatggaggaaaatgcctaccagatgttttgacttctgatatactcgaatatgtgaggagtgggggagaaaacaca
 gttacatgagtaatgggggactcgggagcctaaaggctgtgtgtggctatctccacacttgaatgaagaagaggagtg
 acttgtccgacttcaagtgcacacttgcgaaccgtggttggtgttcagcaaaaactctgaggggccacggcgagtgga
 ggtccacggaaactgttgacagtggatacaggtccttcaagaggagcgatcctgttaatccttatcacataggttctggctatg
 tcttgcaccagccaccagcgccaacgacagtgagatatccagtgtgcgctgacggatgattccatgtccatgacggaca
 gcagtgtatggaattccttctatcgtgtggcgagtaagaaacagctccagagagaaatgcatcgcagtgtaaggcca
 atggcagagtgctctacctcatttcccgagaacccaccgcctgcccgaaggagatgacccccgtggaacccgccaccttg
 cagctgagctgatctcagggtggaaaagctgaagctggagtgtagagagccgccacagcctggaggagcgcctgcagc
 agatccgagaggatgaagagagagaggggtccgagctcacactcaattcggggagggggcgccacgcagcaccaccc
 ctctccctactgcctccggcagctacgaggaagacccgcagacgatactggacgatcacctgtccagggtcctcaagac

ccctggctgccagctccgggcgtaggccgtatagccctcgtcccgctccccggaccaccaccaccaccattcgc
 agtaccactccctgctcccgcccggtggaagctgctcccgccgctcccgccgctgccccctcctcggggg
 caaaggctttgtaccaagcagacgacgaagcatgtccaccaccactacatccaccaccatgccgtccccaagaccaagg
 aggagatcgaggcggaggccacgacgagggtgactgcttctgcccggggcagcgagtattactgtactcgaatg
 caaaagccactccaaggctccggaaccatgccagcgagcagtttggtgcccagcacaacaaaggcctacccttg
 gagtctgcccgtcgtctccaggcgaacgagccagccggcaccatctgtgggggggaacagcgggcacccccgcacc
 acccccgctgccacctgttaccaggaccctgcgatgccttcctgacccacccaacacgctgggtcatctggagga
 ggctgtcgcaggttagctgaggtgtcgaagccccaaagcagcgggtgctgtgtggccagtcagcagagggacaggaat
 cattcgccactgttcagacgggagccacaccccttccaatccaagcctggctccagaagatcacaagagccaaagaa
 actggcaggtgtccacgcgctccaggccagtgagttggtgtcacitacttttctgtggggaagaaattccataccggagga
 tgcgaaggctcagagcttgaccctgggacacttaagagcagctcagcaaaaagggaattataggtattacttcaaaaa
 agcaagcgatgagttgctgtggagcgggtgttgaggagatctgggaggtgagacgggtgctcccgatgtatgaaggcc
 ggattctgggcaaagtggagcggatcgattgagccctggggtctggcttggtgaactgttgagcccgaagctctgtgaa
 ctgtcttggtgtgagcaactgcgacaaaacatttgaagga

DEFINITION Homo sapiens frequently rearranged in advanced T-cell lymphomas
 (FRAT1), mRNA.

ACCESSION XM_050913 SEQ ID NO:41

Attccggctcccgcggtgcaggcgcgcggctagagtgcctggcgggctccggcttcgcgtccgccccggccccggt
 ccagacttagcttcagctcccgccccgctccggcgccgcccaccgcgcccgccgagccgagccccagcgacgcc
 cgcacagctccgggtgccagacagggggccatgccgtgccggaggaggaggaagaggaagccggcgaggaggc
 ggaggggggaggaagaggaggaggacagcttctcctactgcagcagtcagtgccgctgggcagctcggcgagggtg
 accggctgggtggccagatcggcgagacgctgcagctggacgcggcgagcacagccccggctcgcctgcccggccc
 ccggggggcgccgctgcgggccccggggccccctggctgcggcggtgcccggcgagacaaggccaggtccccggcggtg
 cgctgctgctgcccccgcgttgccggagactgtggggccggcgccccctggggctctgcgctgcgcctgggggacc
 gcggccgctgcccgggcccgcgtgcgcctactgcgtggccgagctgccacaggccccagcgcgctgtccccactgc
 cccctcaggccgacctgatggccctccgggagctggcaagcagggcacccgcagccgctgtcgggtccgtgccggc
 gaggatggctccggggcgccgccctcccgccgctgcagcagcgacgcgggtcccaaccagaacccgcacaggc
 gacgacgaccgcaccggcttctgcagcagctagtgtctctggaacctcatcaaggaggccgtgcgaaggcttattcg
 cgacggctgcagttacgtgcaagcttccccaacgcccgtcctggacctctgtcggccccgggtgcatgaaccccttg
 cctcgagccctcgccggcctgcagtgaccctggcgccctccgggagggcgagctcagaactggcgacggcggttctg
 tgctggcagctaacacgcccgggtggccacagcgccagcctcagactggagggaagggttcccttgagggtgctg
 agttctactcaggctggtggagaactctggcttttgaagcgagagtaaaagctaatacgaggaaccgaaaaatcgga
 gtgttcgcccgttaactggggtgaggggcaaaatatttgaatgaaggactttggccctatttaaggcagatttacagagc
 gcacctcaaacgtacaagtcagtaggactccttatttggcgtgacccgacctggccgcggagcctgcatttctcgagcct
 ctgagtcctccagccccgcgacctgtggccacaatccacgcttctccgcatcgcggtgcgcgggaaccacggaggat
 gatgccagttactgtttacctttcagggtggtcctgatccactttgggggaggagaacatgagtagataatttcagggt
 gcagcccaatctgccagacttaaaaaaacatctgtgtctttggagggtgctgcttaatacacaacatgcggtgccatgaagg
 gacctttgggggtgaataggagttaacccctgcgctctcttgaactgtctcttctcagagtgggtgggggaaggctga
 cgacacgggtggggaaaggaggtggggggcggggaggtattgaatgggtgggaagggttagagaggcgcggagtgaacc
 ccacgcccgtgtctaaagtgtatttcagagccggcccgccctctcctcgggtcaaggctcactgttcttgggcacgcactgggt
 gcgggacagagtagccaggttctgcccgtgctcggaagagcgagtggttgaagtgctggagtctcctgaggacac
 gcgcgtgccgccaccgcgggtgtgggaaagcgcgagctgtggcggtgtgtctcggtaggcgaccaccgcccct
 ggccgcgtccgggcttcacggaaactcccagaccgggcccctgggttctcctctcctactcggtctgcagtcctactc
 aagcgggtggctctgggacccctggggcctgggttgggggtagggagacgccatgtgatggacactccaggacacac
 agcctagcacagcagcttataatgggctctccggggccatttgaataacagctgcaattccctggatagacgagttgattc
 ctccctctgcccctccccagccatgccagctggccttgaagtgcaggaaaccgagtagaaaatgtgacctccaatg
 gagaagctgcaggcttggcattgtgaacctgtgaagtgttgaacatactgttactactctaaaggcgctgagactg

tgctgtgttctcgtttttatagtcgaatggctgttcatcatccagatgtggctactgacatatctacacttcgcaccggagtgtctg
gaattgtggctatcctgattataggattttaacttaactgaaatgcctgctttgaataaatgtgttgggtttt

DEFINITION Homo sapiens glycogen synthase kinase 3 beta (GSK3B), mRNA.

ACCESSION XM 010970 SEQ ID NO:42

Gaagggaaggaaggtgattcgcgaagagagtgatcatgtcaggcgccgagaccacctcctttgcggagagctgc
aagccgggtgcagcagccttcagcttttggcagcatgaaagtttagcagagacaaggacggcagcaaggtgacaacagtgg
tggcaactcctgggcagggtccagacaggccacaagaagtcagctatacagacactaaagtattggaaatggatcatttg
gtgtggtatatcaagccaaactttgtgattcaggagaactggcgcctcaagaaagtattgcaggacaagagatttaagaat
cgagagctccagatcatgagaaagctagatcactgtaacatagtcgattgctgtatttcttactccagtgggtgagaagaaa
gatgaggtctatcttaatctgggtgctggactatgttcggaaacagtatacagagtggcagacactatagtcgagccaaaca
gacgctccctgtgatttatgtcaagtgtatatgtatcagctgttccgaagtttagcctatatccattcctttggaatctgccatcg
ggatattaaaccgcagaacctcctgttgatcctgatactgctgtattaaaactctgtgactttggaagtgcgaagcagctggct
cgaggagaacccaatgtttcgtatatctgttctcgggtactataggccaccagagttgatctttggagccactgattatacctcta
gtatagatgtatggtctgctggctgtgtgttggctgagctgttactaggacaaccaatattccaggggtagtggtgtggatc
agttggtagaaataatcaaggtcctgggaactccaacaaggaggcaaatcagagaaatgaacccaaactacacagaattta
aattccctcaaattaaggcacatccttgactaaggtcttccgacccgaactccaccggaggcaattgcaactgtgtagccgt
ctgctggagtatacacaactgcccgaactaacaccactggaagctgtgcacattcatTTTTgatgaattacgggacccaaat
gtcaaaactacaaatgggcgagacacacactgcaactctcaacttcaccactcaagaactgtcaagtaatccacctctggctac
catccttattcctcctcatgctcggattcaagcagctgcttcaacccccacaaatgccacagcagcgtcag

DEFINITION Homo sapiens beta-catenin-interacting protein ICAT (ICAT), mRNA.

ACCESSION NM 020248 SEQ ID NO:43

Ggccgtcctgctgctgctactgccgccgcgcagcggtgctcgggctgagcacgccccggaacaggccgcgcgc
gctgcgcgccggaccgctgcccctgccggcccgccgggtcggcgccagggaccgacagactgacaacggtg
acagcactggggcgccaccttctacttctgccagccacagccctccctcacagttgagcacctgtttgcctgaagttaat
ttcagaagcaggagctcccagagccaggcaggggatgaaccgcgagggagctcccgggaagagtccggaggagat
gtacattcagcagaaggctccgagtgtgctcatgtctgcggaagatgggatcaaacctgacagccagcgaggaggagtcc
tgcgcacctatgcaggggtggtaacagccagctcagccagctgcctccgactccatcgaccaggggtcgagaggacgt
ggatgatggcggtttccaggtcggagacggaagaccggaggcagtagctgcaaagcccttgaacacctggatgctgtg
aagggccaaagagatctgtgtggctcctggccggctgaatggcagcagcccccttccccacctccccctccctaccca
acctgcccctgccccacccacactcacagctactcagtggggctggcatcaaggagagacaccagtgggtgcgtttataatig
gcttaagggtatggactgtgattggctgcaggaagaaactttttatttttaaatcttgaccaacagaaacctttattttatttc
tgactcttatttttaaaaaatttgcgcctcggatctggcttccctggaaagctctccgagctctggtgcttagttaggtcattttt
tagaatgtgaagaggtctgattggctgcttaactggaaaggagctgtattggctggttaatgggaaacggtttttctttg
gctgcaggtgttctgctgatataacagcttccctatttgaatgcagaaaacagggtctgggacattagctgttatattgact
gaaaagaaagaaaccaagtgcgtttgcaatatttattacacaaagaactgctgctgccttcacatttgggtgtgtgtgatt
ggcttcgatgcgtgtgtttggttccattgggtcacctgtgactcctgttgccatggattacccccctctgctgccggctctg
ggcctgagggtccacctggagagtacatttgccttaatgagtgcacctgcctccaccagcaaggggaccccgagaacctg
agcagggtccacagctggaaagttgggccctgaggagctttgtgtcgttgaacgagcagcccaggggcctagaggttaa
ccgttagcggggatttatgtgactgcctgcatgagctggcaaccagccagcgtcccttggtagaaagggtgctgagg
caccgtccaggccccaccggccaggccgcgccagcagaggcgtactaccagctctgtcctcttggccatccttctgtgt
accattcctgaggcctcattttgggggtcatcttgaaaggggaggagcttctccagtgtagacccaaagactctgga
ggtcatctggcggaggtctctgggagcccagaaccacataaaagccccagcttggctcacaaggccaggagacctcc
agctaaacaccaacctgacctacccagccaggctcctacctgtctgctgccagcacagtaggtcccgccagctctg
gagttctctatcggaggcccatgccctccactccactgcctttggaagggtctctctccaggtcagcctggaaggacagt
atcgtttgttatgaaatgccactgggacagctggctgggccttcaccaagcaagtccttcagactggcccttaagccaaac
tcaggcccagaattgcagttcagaatggcagtcctggaggcaggggtgaggggcaggtctagtgttctgcacaaacc
taagtcttccacctgccacccccctccctgggagggaggtggtcctctatctcctggctcactggcaggtgtgggactctg

gggagagcggcgtggagaaagatgcagtcctcaggaagggggccgccaccctcccctatgctggtagatgctgaggccc
ctaggtgccagggccagtgaggaccctcagaaacaaatcttccctttctcggggcgtggggctcgggcccgtaggggc
tcctgagtgtcatgaagtgcacaggagccaaatgaccgagccctggagagccccatggtgggtaggtggttcgtgctgtgc
ctggccaccatcagcctgttcagaaggaggattcagcatcaggctaagaccctgtgtcctccaccatgcactcacccta
gcccgtggttagctgacagtcagctgtggggaacacagctacaaccctaccctggcagggacctgagagcatctcaggagg
ggcagcgcgatgtgtcatgtgtgtgtgagtgagcacaccgtgtgcacactatacacatgtgcacacacacgcactctc
cccgtcaggggcctggaggctgtggtgagccccctggggaaaggtgagttcttcatctccctcctccaggctcggagtgcct
ggagtgcaggtgtcaggccacattgctggctgccccctctttagctcctataaaggggccacacctggtggatacctggtt
gagcgtgtggtctctgccccagcctgtcctgtcacgatcacaggccttgctttgtaacaatgatgaccccggtctgtcat
cttctgaagaggaaaagtcaaagtgttgctgtggctccatattcaactaaaaatatactgttgagaaagaaattaacaataa
agaattttcataggttaaaaaaaaaaaaaaag

DEFINITION Homo sapiens Dvl-binding protein IDAX mRNA, complete cds.

ACCESSION AF272159 SEQ ID NO:44

Ggcggcaggaccagcatgcaccaccgaaacgactcccagaggctggggaaagctggctgcccggcagagccgtcgtt
gcaaatggcaataactaatttctctccacctatcccctgaacactgcagaccttggcggggggaatgatgaacaagctca
aatgcggcgctgctgaagcagagataatgaatctccccgagcgcgtggggacttttccgctatcccggtttagggggcat
ctcattacctccaggggtcatcgtcatgacagcccttactccccgcagcagcctcagcagcgtcacagacagtgcgtt
caaattgcaatctggcagactgcccgcagaatcattcctcctcctcctcgtcctcctcagggggagctggcggagccaac
ccagccaagaagaaggagaaaaggtgtggggtcgtgctgcccgtcgaaggctcatcaactgtggcgtctgcagcagtg
caggaaccgcaaacgggacaccagatctgcaaattagaaaatgtgaagagctaaagaaaaacctggcacttcactag
agagaacacctgttcccagcgtgaagcattccgatggtcttttaagcagtagtatcttatttcaaggcatttggaatg
aaggggcaactaatgtcttgtttaagaaactgcttagtccaccactgaagaaaatatccagaaattatttcatttatgtatagg
gatttctcaaaaaaaaaaaaaa

DEFINITION Homo sapiens orphan nuclear receptor (PAR1) mRNA, complete cds.

ACCESSION AF084645 SEQ ID NO:45

Cctctgaaggttctagaatcgaatgtaattcgtgggacgggaagaggaagcactgccttacttcagtgggaatctcggcc
tcagcctgcaagccaagtgttcacagtgaaaaaagcaagagaataagctaatactcctgtcctgaacaaggcagcggctcc
ttgtaaaagctactccttgatcgtcctttgaccggattgtcaaagtggacccaggggagaagtcggagcaaaagactt
accaccaagcagtcgaagaggccagaagcaaacctggagggtgagacccaaagaaagctggaaccatgtgactttgta
cactgtgaggacacagagtctgttctggaaagcccagtgtaacgcagatgaggaagtcggagggtcccaaatctgccg
tgtatgtggggacaaggccactggctatcacttcaatgtcatgacatgtgaaggatgcaagggtttttcaggaggggccatg
aaacgcaacgcccggctgaggtgccccctccggaaagggcgctgcgagatcacccggaagaccggcgacagtgcc
ggcctgccgctgcgcaagtgcctggagagcggcatgaagaaggagatgatcatgtccgacgaggccgtggaggagag
gcgggccttgatcaagcgggaagaaaagtgaacggacagggactcagccactgggagtcagggggtgacagaggagc
agcggatgatgatcaggagctgatggacgtcagatgaaaacctttgacactaccttctccatttcaagaatttccggctg
ccagggggtgcttagcagtggctgcgagtgccagagtctctgcaggccccatcagagggaagaagctgccaagtggagcc
aggtccggaagatctgtgctcttgaaggtctctctgcagctgcggggggaggatggcagtgctggaactacaacccc
cagccgacagtggcgggaaagagatcttctcctgtgccccacatggctgacatgtcaacctacatgttcaaggcatcat
cagctttgcaaaagtcattctcctacttcagggacttggccatcaggaccagatctccctgctgaagggggccgcttccgag
ctgtgtcaactgagattcaacacagtgttcaacgcggagactggaacctgggagtggtggccggctgtcctactgcttgaag
acactgcaggtggcttccagcaacttctactggagcccattgctgaaattccactacatgtggaagctgcagctgcatga
ggaggagtatgtgtgatgcaggccatctcctcttctccagaccgcccaggtgtgctgcagcaccgcgtgttggaacca
gtgcaggagcaattgccattactctgaagtcctacattgaatgcaatcggccccagcctgctcataggttcttcttctgaa
gatcatggctatgctcaccgagctccgcagcatcaatgctcagcacaccagcggctgctgcgatccaggacatacacc
cctttgtacgcccctcatgcaggagttgttcggcatcacaggtagctgagcggctgcccttgggtgacacctccgagagg
cagccagaccagagccctctgagccgccactcccgggccaagacagatggacactgccaagagccgacaatgccctg
ctggcctgtctccttagggaattcctgtatgacagctggctagcattcctcaggaaggacatgggtgccccccaccccca

gttcagtctgtaggagtgagccacagactcttacgtggagagtgcactgacctgtaggtcaggaccatcagagaggcaa
 ggttgccctttcttttaaaaggccctgtggtctggggagaaatccctcagatcccactaaagtgtcaagggtgtggaaggac
 caagcgaccaaggataggccatctggggtctatgccacatacccacgtttgttcgcttctgagcttttcattgtactctta
 atagtcctgtctcccacttcccactcgttcccctcctctccgagctgctttgtgggtcaaggcctgtactatcggcaggtgc
 atgagtatctgtgggagtcctctagagagatgagaagccaggaggcctgcaccaaagtgcagaagcttggcatgacctatt
 ccggccacatcattctgtgtctctgcatccattgaacacattattaagcactgataataggtagcctgtgtgggtatacagc
 attgactcagatatagatcctgagctcacagagtttatagttaaaaaaacaaacagaaacacaaacaatttggatcaaaagga
 gaaaatgataagtgacaaaagcagcacaaggaatttccctgtgtggatgctgagctgtgatggcaggcactgggtacccaa
 gtgaagggtcccaggagacatgagtctgtaggagcaagggcacaactgcagctgtgagtgctgtgtgatttgggttag
 gtaggtctgttggcacttgatgggctgggtttgttctggggctggaatgctgggtatgctctgtgacaaggctacgctga
 caatcagttaaacacaccggagaagaaccatttacatgcacctatatttctgtgtacacatctatttcaaaagctaaagggtat
 gaaagtgcctgcctgtttatagccactgtgagtaaaaaatttttgcattttcacaattatactttatataaggcattccacacct
 aagaactagtttgggaaatgtagccctgggttaatgtcaaatcaaggcaaaaggaattaaataatgtacttttgctaaaaa
 aa

DEFINITION Homo sapiens transforming growth factor beta-activated

kinase-binding protein 1 (TAB1), mRNA.

ACCESSION XM 010000 SEQ ID NO:46

Cccgcaggggttctccaagatggcggcgagaggaggagcttgctgcagagtgagcagcagccaagctggacagat
 gacctgcctctctgccacctcttggggttggtcagcctccaaccgcagctactctgctgatggcaaggcactgagagc
 caccgccagaggacagctgggtcaagttcaggagtgagaacaactgcttctgtatggggtctcaacggctatgatggc
 aaccgagtgaaccaactctgtggcccagcggtgtccgcagagctcctgctgggccagctgaatgccgagcacgccgagg
 ccgatgtgcggcgtgtgctgctgcaggccttcgatgtggtggagaggagcttctggagtccattgacgacgccttggctg
 agaaggcaagcctccagtcgcaattgccagaggagtcctcagcaccagctgcctcctcagtatcagaagatccttgaga
 gactcaagacgttagagagggaatttcgggagggggccatggccgttggcggtccttctcaacaacaagctctacgtcg
 ccaatgtcgttacaaaccgtgcacttttatgaaatcgacagtggatgggttgacagctgaacgtggaccaca
 ccacagagaacgaggtatgagcttctcgttcttcgcagctgggcttggatgctggaagatcaagcaggtggggatcatct
 gtgggcaggagagcaccggcggtatggggattacaaggttaaatatggctacacggacattgaccttctcagcgctgcc
 aagtccaaaccaatcatcgagagccagaaatccatggggcacaagccgctggatggggtgacgggcttcttgggtgctgat
 gtcggaggggtgtacaaggccctagaggcagcccatgggcctgggcaggccaaccaggagattgctgcgatattgac
 actgagtttccaagcagacctccctggaogcagtgggccaggccgtcgtggaccgggtgaagcgcatccacagcgaca
 ccttcgccagtgggtggggagcgtgccagggttctgccccggcacaggagacatgacctgctagttaggaactttggctac
 ccgctgggcgaaatgagccagcccacaccgagcccagcccagctgcaggaggacgagtgtacctgtgtctgtgccat
 actccagcggccagagcaccagcaagaccagcgtgaccttctccttgcctatgccctcccagggccagatggtaacgg
 ggctcacagtgttccaccttgacgaagccacccccacccctaccaaccaaagcccacccctaacctgacgtccacca
 acacgcacacgcagagcagcagctccagctctgacggaggcctcttccgctcccggcccggccactcgtcccgctgg
 cgaggacggtcgtgtgagccctatgtggacttctgagttttaccgcctctggagcgtggaccatggcgagcagagcgtg
 gtgacagcaccgtagggcagccggagaatgcagcccaagcaggccctggcatggggcaggacagggtccagccttttc
 ctaacatctgcctgtgccacaacggccagcaggtgccccatcctctgccacagcagactctgtcccatggctctccgggc
 agtagagtgtgtgagtcagactggacctgtggttcatacctgtcaccacccgggaagctgaaggccacttctccagat
 ggctcagccaggacctgcctttctcagagcagagggccaggtatagaaaccgagtgggcctgcaagccggccga
 gcctcccagcagcctctacagagcagggaagggcgccctgtgaacctgagtggtgacggccagcagacctgtgtg
 tcccaagcccacccctctcccaccatcacctccctcacctcgggacagtagccctccacttctccagcctctcagccctgt
 gtcctgtcatccagagtgaacccaggctggtgtccgcatctgtccctgggccccacccctggacctgccttgggtgtgca
 tctgtgttaacgttcaggaggaccaggggcagcatctggggcctgggatggccacagaaggggcaggccaggtgga
 ggagccaggggggaagtgggttaagagacctggaactgccagaggatggcgccctgggcttcccagagccaggcgtgc
 gggagaggtgaggactggccccgggtgggtgaggcagggggcgctgtcgtcaggcctgagccagggtgagctggtgc
 ctgccttgcatttcttcttgggtgtgtgaagaccataggctggcaggcagctgagatgaactgtctttaccactgatgagggg

cctctgccggctgagggtagcaagcaggggtgtgagtcaggctgggggactgtttgaaagaaagaggagtggaaaatg
gttccaggagggaagaggttctttgagacacagtagccctgggaggcataggagaagggctcgggccagcccagcccagg
gcctgagttagactatttcccacatgttctctgcttcagtggggaggggggtgccaccagggtgtcggccaggattgccac
tcctgtttcagaggaagcaggccgagagacttgcaccttggccaagccacacaatcagtggggcagccagagctcagac
ctgagccattttgtcagtatccaggacccccggattctccacgcccctcccctcctcagctccttcccccatgcccc
gaccggcccaccagggtactagccgctgtcgcacagcctctgggggtgcttggctctcgcgaagtcaaaaggcctgacagctc
tgtggcctgggaatccatttctcggcagagcagggcctgggtggaaccaggagctgtgggaagccacagcagaa
atggaagaaaaacaggtctcagcccagggtcctcgtcactccctcactccccactttgaagccatctctgttctgcaggtga
gaggatttaaagtcagtcacaaaggcttgggaacaaaaggaaattc

Nuclear acting components:

DEFINITION H.sapiens mRNA for beta-catenin.

ACCESSION X87838 SEQ ID NO:47

Aagcctctcgggtctgtggcagcagcgttggccccggccccgggagcggagagcagggggaggcggagacggaggaag
gtctgaggagcagctttagtccccgccgagccgccaccgcaggtcaggacggctcgactcccgcggcgggaggagc
ctgttccctgaggggtatttgaagtataccatacaactgttttgaataccagcgtggacaatggctactcaagctgattgatg
gagttggacatggccatggaaccagacagaaaaagcggctgttagtactggcagcaacagcttacctggactctggaatc
cattctgggtccactaccacagctccttctcgtggtgtaaaaggcaatcctgaggaagaggatgtggatacctccaaagtcc
gtatgagtggaacagggtatttctcagtccttcaactcaagaacaagtagctgatattgatggacagtatgcaatgactcgag
ctcagagggtacgagctgctatgttccctgagacattagatgagggcatgcagatcccctacacagtttgatgctgctcat
cccactaatgtccagcgttggctgaaccatcacagatgctgaaacatgcagttgtaacttgattaactatcaagatgatga
gaacttgccacacgtgcaatccctgaactgacaaaactgctaaatgacgaggaccagggtgggtggttaataaggctgcagtt
atggtccatcagctttctaaaaaggaagcttcagacacgctatcatgcgttctcctcagatgggtgtctgctattgtacgtacca
tgagaatacaaatgatgtagaacagctcgttgaccgctgggaccttgcataaccttcccatcatcgtgagggcttactg
gccatctttaagctcggaggcatcctgcccgtgtaaaatgcttgggtaccagtggttctgtgttgtttatgccattacaact
ctccacaacctttattacatcaagaaggagctaaatggcagtgctttagctgggtgggctgcagaaaatggttgccttgctc
aacaacaaatgttaattcttggctattacgacagactgccttcaattttagcttatggcaaccaagaagaaagcagctcatc
atactggctagtgggtggacccaagcttttagtaataatgaggacctatacttacgaaaaactactgtggaccacaagcag
agtgtgaaggtgctatctgtctgctctagtaataagccggctattgtagaagctgggtggaatgcaagctttaggacttcac
gacagatccaagtcaacgtctgttcagaactgtcttggactctcaggaaatcttcagatgctgcaactaaacaggaagggtat
ggaaggtctccttgggactcttgttcagcttctgggttcagatgataaatgtggtcacctgtgcagctggaattcttctaacc
tacttgcaataattataagaacaagatgatggtctgccaagtgggtggtatagaggctcttgcgtactgtccttcgggctg
gtgacaggggaagacatcactgagcctgccatctgtgctctcgtcatctgaccagccgacaccaagaagcagagatggcc
cagaatgcagttgccttactatggactaccagttgtggttaagctcttacaccaccatcccactggccttgataaaggct
actgttggtgattgattcgaatcttgccttctgcccgaatcatgcaccttgcgtgagcagggtgccattccacgactagttc
agttgctgttcgtgcacatcaggataccagcgcgtacgtccatgggtgggacacagcagcaatttggagggggggtcc
gcatggaagaaatagttgaaggtgtaccggagcccttcacatcctagctcgggatgttcacaaccgaattgtatcagagg
actaaataccattccattgtttgtgcagctgctttattcctccattgaaaacatccaaagagtagctgcaggggtcctctgtgaa
cttgcctcaggacaaggaagctgcagaagctattgaagctgagggagccacagctcctctgacagagttacttacttagg
aatgaaggtgtggcgacatatgcagctgctgtttgttccgaatgtctgaggacaagccacaagattacaagaacaggcttc
agttgagctgaccagctctcttcagaacagagccaatggcttgaatgagactgctgatcttggacttgatattggtgccc
gggagaacccttggatatgccaggatgatcctagctatcgttcttctcactctgggtgatatggccaggatgccttgggtat
ggaccccatgatggaacatgagatgggtggccaccacctgggtgctgactatccagttgatgggtgccagatctggggtc
atgccaggacctcatggatgggtgcctccaggtgacagcaatcagctggcctggttgatactgacctgaaatcatcctt
tagctgtattgtctgaacttgcattgtattggcctgtagagttgctgagagggctcaggggtgggtggtatctcagaaagt
gcctgacacactaaccaagctgagtttctatgggaacaattgaagtaaaacttttgttctggctcttttggctcaggagtaac
aatacaaatggatttgggagtgactcaagaagtgaagaatgcacaagaatggatcacaagatggaatttagcaaaccttag
ccttgcctgttaaaatttttttttttttttaagaatactgtaatggtagtactgacttgccttgccttgaagtagctcttttttttttttt

ttttttgcagtaactgtttttaagtcctcgtagtgttaagttatagtgaatactgctacagcaatttctaattttaagaattgagt
aatgggtgtagaacactaattaattcataatcactctaattaattgtaatctgaataaagtgaacaattgtgtagcctttttgtataa
aatagacaaatagaaaatggccaattagttccttttaatatgcttaaaataagcagggtggatctatttcatgttttgatcaaaa
actatttgggatatgtatgggtagggtaaatcagtaagaggtgtatttggaaacctgttttgacagtttaccagttgcctttat
cccaaagtgtgtaacctgctgtgatacgtgctcaagagaaaatgcgggtataaaaaatggttcagaattaaacttttaattc
att

DEFINITION Homo sapiens b-TRCP variant E3RS-IkappaB mRNA, partial cds.

ACCESSION AF101784 SEQ ID NO:48

Atggaccggccgaggcgggtgctgcaagagaaggcactcaagtttatgtgctctatgccagggtctctgtggctgggctg
ctccagcctggcggacagcatgccttcgctgcatgctgtataaccagggtggtgcactcacagctttccagaattcc
tcagagagagaagactgtaataatggcgaacccctaggaagataataccagagaagaattcacttagacagacatacaa
cagctgtgccagactctgcttaaccaagaacagtatgttttagcaagcactgctatgaagactgagaattgtgtggccaaa
acaaaacttccaatggcacttccagtatgattgtgoccaaagcaacggaaactctcagcaagctatgaaaaggaaaaggaa
ctgtgtgtcaaatactttgagcagtggtcagagtcagatcaagtggaaattgtggaacatcttatccaaatgtgtcattacc
aacatgggcacataaactcgtatctaaacctatgttcagagagatttcataactgctctgccagctcggggattggatcata
tcgctgagaacattctgtcatacctggtatgccaaatcactatgtgctgctgaactgtgtgcaaggaaatgtaccagtgacct
ctgatggcatgctgtggaagaagcttatcgagagaatgggtcaggacagattctctgtggagaggcctggcagaacgaaga
ggatggggacagtatttattcaaaaacaaacctcctgacgggaatgctcctccaaactcttttatagagcactttatcctaaaa
ttatacaagacattgagacaataagaatctaattggagatgtggaagacatagtttacagagaattcactgccgaagtgaaca
agcaaggagtttactgtttacagtatgatgatcagaaaatagtaagcggccttcgagacaacacaatcaagatctgggata
aaaacacattggaatgcaagcgaattctcacaggccatacaggttcagtcctctgtctccagtatgatgagagagtgtcata
acaggatcatcggattccacgggtcagagtggtggatgtaaatacaggtgaaatgctaaacacgttgattcaccattgtgaag
cagttctgcacttgcgtttcaataatggcatgatggtgacctgctccaaagatcgttcattgctgtatgggatatggcctcccc
aactgacattaccctccggagggtgctggtcggacaccgagctgctgcaatgtgttagactttgatgacaagtacattgttc
tgcacttggggatagaactataaaggatggaacacaagtaactgtgaattgtgaaggaccttaattggacacaacagaggc
attgcctgtttgagtagcaggacaggctggtagtgtggtcctatctgacaacactatcagattatgggacatagaatgtgg
tgcattgttacagtggttagaaggccatgaggaattggtgctgtattcattgataacaagaggatagtcagtggggccta
tgatggaaaaattaaagtgtggatctgtggctgcttggacccccgtgctcctgcaggacactctgtctacggaccctgtg
ggagcattccggaagagttttcgactacagttgatgaattccagattgtcagtagttcacatgatgacacaatcctcatctgg
gacttcctaaatgatccagctgcccaggtgaaccccccggttcccctctcgaacatacacctacatctccagataa

DEFINITION Human CREB-binding protein (CBP) mRNA, complete cds.

ACCESSION U47741 SEQ ID NO:49

Tgaggaatcaacagccgccatctgtcgcggaccgggggcttcgagcgcgatctactcggccccgccggtcccg
ggccccacaaccgcccgcgtcgtcctctcctcgcagccggcagggcccccgacccccgtcggggccctcgcgggc
ccggccgcccgtgcccggggctgttttcgcgagcaggtgaaaatggctgagaacttgctggacggaccgccaacccca
aaagagccaaactcagctcgcgggtttctcggcgaatgacagcacagatttggatcattgttgacttggaaaatgatcttc
ctgatgagctgatacccaatggaggagaattaggccttttaaacagtgggaacctgttccagatgctgcttccaaacataaa
caactgtcggagcttctacgaggaggcagcggctctagatcaacccaggaataggaaatgtgagcgccagcagccccgt
gcagcagggcctgggtggccagggtcaagggcagccgaacagtgtcaacatggccagcctcagtgccatgggcaagag
ccctctgagccaggagattctcagccccagcctgctaataacaggcagccagcacctctggggccacccccgtgcct
cccaagcactgaatccgcaagcacaagaagcgaagtggggctggcgactagcagccctgccacgtcacagactggacctg
gtatctgcatgaatgtaactttaaccagacccacccaggcctcctcaatagtaactctggccatagcttaattaatcaggcttc
acaagggcaggcgcaagtcataatggatctcttggggctgctggcagaggaaggggagctggaatgccgtaccctact
ccagccatgcaggggcctcagcagcgtgctggctgagaccctaacgcaggtttccccgcaaatgactgggtcacgcgg
gactgaacaccgcacaggcaggagcatggccaagatgggaataactgggaacacaagtccatttggacagcccttagt

caagctggaggcagccaatgggagccactggagtgaacccccagttagccagcaaacagagcatggtaacagttgc
ccaccttccctacagatatcaagaatacttcagtcaccaacgtgccaaatatgtctcagatgcaaacatcagtggaattga
cccacacaagcaattgcaacaggccccactgcagatcctgaaaaacgcaaactgatacagcagcagctggttctactgctt
catgtctataagtgtcagagacgagagcaagcaaacggagaggttcgggcctgctcgtctccgcattgtcgaaccatgaa
aaacgttttgaatcacatgacgcattgtcaggctgggaaagcctgccaaagtggccattgtcatcttcacgacaaatcatctc
tcattggaagaactgcacacgacatgactgtcctgtttgctccctttgaaaaatgccagtgacaagcgaaaccaaaacc
atcctgggggtctccagctagtgtgaattcaaaacacaattggttctgttggcacaggggcaacagaatgccacttcttaagtaac
ccaaatcccatagaccccagctccatgcagcagcctatgtgtctctcgactcccctacatgaaccagccccagacgca
gctgcagcctcaggttctggccagcaaccagcacagcctcaaacccaccagcagatgaggactctcaacccctggga
aataatccaatgaacattccagcaggaggaataacaacagatcagcagccccaaacttgatttcagaatcagctcttcga
cttccctggggggccacaaaccactgatgaacgatgggtccaactctggttaacattggaacccctcagcactataccaacag
cagctcctcctctagcaccgggtgaaggaaaggctggcacgaacatgtcactcaggacctgcggagccatctagtgcata
aactgtccaagccatcttcccaacacctgatccgcagctctaaaggatgccgcagtgaaaacctggtagcctatgctaa
gaaagtggaaaggggacatgtacgagtctgcaacagcagggatgaatattatcacttattagcagagaaaatctacaagat
acaaaaagaactagaagaaaaacggaggtcgcgtttacataaacaaggcatcttgggggaaccagccagccttaccagccc
cggggggtcagccccctgtgattccacaggcacaacctgtgagacctccaaatggacccctgtccctgccagtgaatcgca
tgcaagtttctcaaggatgaattcatttaaccccatgtccttggggaacgtccagttgccacaagcacccatgggacctgt
gcagcctcccaatgaaccactctgtccagatgaacagcatgggtcagtgccaggatggccatttctccttccgaatgc
ctcagcctccgaacatgatgggtgcacacaccaacaacatgatggcccaggcgcccgtcagagccagtttctgccacag
aaccagttcccgtcatccagcggggcgatgagtgtggcatggggcagccgccagcccaaacaggcgtgtcacaggga
caggtgcctgggtgtgtcttcttaacccctctcaacatgtggggcctcaggccagccagctaccttgccttccagtgcac
agtcaccactgcaccaacaccgcctcctgttccacggctgtgtggcatgccatctctccagcacacgacaccacctggga
tgactctccccagccagcagctccactcagccatcaactcctgtgtcgttccgggcagactcccaccccgactcctgg
ctcagtgcccagtgctacccaaaccagagcacccctacagtccaggcagcagcccaggccaggtgacccgcagcct
caaacccagttcagccccctgtgtgggtacccctcagtcacgcagcaaacagccgacgcctgtgcagcccagcctcct
ggcacaccgtttccaggcagcagccagcattgataacagagtccttaccctcctcgttggccagcgagaaaccaa
ttccagcagccaggacctgacgtacctgtgtggaatgaagacggagacccaagcagaggacactgagccgatcct
ggtgaatccaaaggggagcccaggtctgagatgatggaggaggatttgcaaggagcttccaagttaaagaagaaacag
acatagcagagcagaaatcagaaccaatggaaaggatgaaaagaaacctgaagtgaagtagaagtaaagaggaaga
agagagtagcagtaacggcacagcctctcagtcacatctccttcgcagccgcgcaaaaaaatctttaaccagaggagt
acgccaggccctcatgcaaccctagaagcactgtatgcagaggaccagagtcattaccttccggcagcctgtatgcc
ccagctcctcggaattccagactatittgacatcgtaaagaatcccatggacctctccaccatcaagcgggaagctggacaca
gggcaataccaagagccctggcagtacgtggacgacgtctgggtcatgttaacaatgcctgggtctataatcgcaagaca
tcccagagtctataagtttgcagtaagcttgcagaggtctttgagcaggaaattgacctgtcatgcagtccttggatattgt
gtggacgcaagtatgagtttcccccacagactttgtgtgtatgggaagcagctgtgtaccattcctcgcgatgtgcctact
acagctatcagaataggtatcatttctgtgagaagtgttcacagagatccaggggcagaatgtgacctgggtgacgccc
ttcacagccccagacgacaatticaaaggatcagtttgaagaagaagaaatgataccttagaccccgaaccttctgtgatt
gcaaggagtgtggccggaagatgcacagatttgcgttctgactatgacatcatttggccttcaggtttgtgtgcgacaact
gcttgaagaaaactggcagacctcgaaaagaaaacaaattcagtgctaagaggctgcagaccacaagactgggaaacca
cttggaaagaccgagtgaacaaattttcggcgccagaatcacctgaagccggggaggttttgcggagtgtggccag
ctcagacaagacgggtggaggtcaagcccgggatgaagtcacgggttgggttctggggaaatgtctgaatcttcccatat
cgaaccaaagctctgtttgttttgaggaaattgacggcgtggatgtctgtttttggaatgcacgtccaagaatacggctctg
attgccccctccaaacacaggcgtgtgtacatttctatctggatagtatttcttccggccacgttgcctccgcacagc
cgtttaccatgagatccttattggatatttagatgtgaagaaattagggtatgtgacagggcacatctgggcctgtcctcca
agtgaaggagatgattacatctccattgccacccacctgatcaaaaaataccaagccaaaacgactgcaggagtgtgtac
aaaaagatgtggacaaggcggttgcagagcggatcatccatgactacaaggatattttcaacaagcaactgaagacagg
ctcaccagtgccaaggaactgccctattttgaagggtgatttctggcccaatgtgttagaagagagcattaagggaactagaaca

agaagaaggagaggaaaaaggaagagagcactgcagccagtgaaccactgagggcagtcagggcgacagcaag
aatgccaaagaagaacaacaagaaaaaccaagaacaaaagcagcatcagccgcgccaacaagaagcccag
catgcccaacgtgtccaatgacctgtcccagaagctgtatgccaccatggagaagcacaaggaggtcttcttctgtatccac
ctgcacgctgggctgtcatcaacacctgtcccccatcgtcgaccccgacccctgtcagctgtgacctcatggtggg
cgcgacgccttctcacctcgccagagacaagcactgggagttctctcttgcgcgctccaagtgtccacgctctgc
atgctggtggagctgcacacccaggggccaggaccgtttgtctacacctgcaacgagtgaagcaccacgtggagacgc
gtggcactgcactgtgtgcgaggactacacctgtcatcaactgtataacacgaagagccatgcccataagatggtga
agtgggggctgggctggatgacgagggcagcagccaggggcagccacagtcaaagagccccaggagtcacgccc
ggtgagcatccagcgtgtcatccagctgctggtgcacgctgtccagtgccgaacgccaactgtcgtgctccatctgcc
agaagatgaagcgggtggtgcagcacaccaagggctgcaaacgcaagaccaacggggggtgcccgggtgtgcaagcag
ctcatcgccctctgtgtctaccacgccaagcactgccaagaaaacaaatgccccgtgccccttctgcctcaacataaacaca
agctccgccagcagcatccagcaccgctgcagcaggcccagctcatgcccggcggtatggccaccatgaacaccc
gcaacgtgctcagcagagtgtgcttctctacctcagcaccgcccgggacccccacacagcagcccagcacacccca
gacggcgagccccctgccagcccccaacctcacccgtgagcatgtcaccagctggcttccccagcgtggccccggact
cagccccccaccacgggtgtccacagggaagcctaccagccagggtgcccggccccccaccccccggccagccccctct
gcagcgggtggaagcggctcggcagatcagcgtgagggcccagcagcagcagcacctgtaccgggtgaacatcaacaac
agcatgccccaggacgcacgggcatggggacccccggggagccagatggccccgtgagcctgaatgtgccccgacc
caaccagggtgagcgggcccgtcatgcccagcatgcctccgggagtgccagcagggcggcccttccccagcagcagcc
catgccagggttggccaggcctgtgatatccatgcaggccaggcgccgtgggtgggccccggatggccagcgtgcag
ccaccaggagcatctcaccagcgtctgcaagacctgtgctgggacctgaagtcgcccagctccccagcagcaaac
agcaggtgctgaacattctaaatcaaaccgcagctaattggcagcttcatcaaacagcgcacagccaagtacgtggcca
atcagccccggcatgcagccccagcctggcctccagtcacagccggcatgcaacccagcctggcatgcaccagcagc
ccagcctgcagaacctgaatgccatgcaggctggcgtgcccggggcggtgtgctccacagcagcagggcatggggag
gcctgaacccccaggggccaggcctgaacatcatgaacccaggacacaaccccaacatggcgagtatgaatccacagta
ccgagaaatgttacggagggcagctgtgcagcagcagcagcaacagcagcagcaacaacagcagcaacagcagcagc
agcaaggagtgccggcatgggtggggcatggcggggcagcggccagttccagcagcctcaaggacccggaggctac
ccaccggccatgcagcagcagcagcgcagcagcatctccccctcaggggcagctccatggggcagatggcggt
cagatgggacagcttggccagatggggcagccgggggtgggggcagacagcaccaccaacatccagcaagccctgca
gcagcggattctgcagcaacagcagatgaagcagcagattgggtccccaggccagccgaaccccatgagccccagca
acacatgctctcaggacagccacaggcctcgcattcctggccagcagatgccacgtcccttagtaaccagtgctgggtc
tccagccccgtccagctccacggccccagtcacagcctccacattccagccgtcaccacggatacagccccagccttc
gccacaccacgtctacccccagactggttccccccaccggactcgcagtcaccatggccagctccatagatcaggac
acttggggaacccgaacagagtcaatgctccccagctgaacacccccagcaggagtgcgtgtccagcgaactgtc
cctggtcggggacaccacgggggacacgctagagaagtttggagggtttagcattgtgagagcatcaccttttccctt
tcatgttcttgacctttgtactgaaaatccaggcatctagggttttttattccttagatggaactgcgacttccgagccatggaa
gggtggattgatgtttaaagaacaatacaagaataatatttttgttaaaaaccagttgatttaaatatctggtctctcttgg
ttttttggcgggggggtggggggggttcttttttccgttttgttttgggggggaggggggttttggattcttttgc
gtcattgctggtgactcatgcttttttaacgggaaaaaagttcattatattcatatttttatttgaatttcaagactttaacat
ttatgtttaaagtaagaagaaaaataatttcagaactgattcctgaataatgcaagcttataatgtatcccgataactttgtg
atgtttcgggaagattttttctatagtgaactctgtggcgtctccagctattaccctggatgataggaattgactccggcgtgc
acacacgtacacaccacacacatctatctatacataatggctgaagccaaactgtcttgcagatgtagaaattgttgccttgc
ttctctgataaaactggttttagacaaaaaataaggatgatcactcttagaccatgctaattgtactagagaagaagccttcttt
ctttctctatgtgaaactgaaatgaggaaaagcaattctagttaaactcatgcaagcgtctaatcctataataacgaaactc
gagaagattcaatcactgtatagaatggtaaaaataccaactcatttcttatcatattgttaataaactgtgtgcaacagacaa
aaagggtggtccttctgaattcatgtacatggtatfaacacttagtgttcgggggtttttgttatgaaaatgctgtttcaacattgt
atttgactatgcatgtgtttttccattgtatataaagtaccgttaaaattgatataaattactgaggttttaacatgtatctg
ttcttaagatccccgtgaagaatgttaagggtttttatttatatatatttttggctgttcttgtaaaaaataaaaaa

DEFINITION Homo sapiens C-terminal binding protein 1 (CTBP1), mRNA.

ACCESSION NM 001328 SEQ ID NO:50

Cgcgagcgccggagtggtcggggcccgccgctcgcctctcgatgggcagctgcacttgcacaagg
gcctgccgttgccgtccgacctccgatcatgaacggggccctgcacccggggccctgggtggcattgctggatggccgg
gactgcacagtggagatgccatcctgaaggacgtggccactgtggccttctgcgacgcgagtcacgcaggagatcca
tgagaaggtcctgaacgaggctgtggggccctgatgtaccacaccatcactctaccaggaggacctggagaagtca
aagccctccgcatcatctcggattggcagtggtttgacaacatcgacatcaagtcggccggggatttaggcattgccgt
ctgcaacgtgcccggcggtctgtggaggagacggccgactcgacgctgtgccacatcctgaacctgtaccggcgggcc
acctggctgcaccaggcgctgcgggagggcacacgagtcagagcgctgagcagatccgcgaggtggcgccggcg
tgccaggatccggggagaccttgggcatcatcgacttggcgcgtggggcaggcagtgccgctgcgggccaaggc
cttcggcttcaactgtcttctacgaccttacttgcggatggcgtggagcggcgctggggctgcagcgtgtcagcacc
ctgcaggacctgctctccacagcgactgcgtgacctgcactgcggcctcaacgagcacaaccaccacctcatcaacga
cttcacctgaagcagatgagacaaggggcttctggtgaacacagccgggggtggcctgggtggatgagaaggcgctg
ggccaggccctgaaggaggccggatccgcggcgcccgctggatgtgcacgagtcggaaccttcagcttagccag
ggccctctgaaggatgacccaacctcatctgaccccccatgctgcatgttacagcagcaggcatccatcgagatgcg
agaggaggcgccgagatccgcagagccatcacaggccggatccagacagcctgaagaactgtgtcaacaagg
accatctgacagccgccaccttgggcccagcatggaccccgccgctgctgcacctgagctcaatggggctgcctatagg
tacctccggcggtgggtggcggtggccccacttggcatccagctgctgtggaaggatctgtcccagcgccatgtccctg
tcccaggcctgccccctgtggccacccggccacgccccttctcctggccaaaccgtcaagcccaggcggtatagag
accacgccagtgaccagttgtgcccgggaggagctctccagcctcggcgccctggggcagcggggccggaaacctcg
accagagtgtgtgagagcatgtgtgtgggtggccctggcactgcagagactgggtccgggctgtcaggaggcgggagg
cgacgctggggcctcgtgtcgttgcgtccgtcctgtggcgctctgcctgtgtccttcgcgttcctgttaagcagaag
aagtcagtagttatttcccatgaacgttctgtctgtacagttttagaacattacaaaggatctgtttgcttagctgtcaaa
aaagaaaacctgaaggagcatttgaagtcaatttgggtttttttttgtttttttttttgttttttgaacgtccccagaatg
aggcagttggcaactctcaggacaatgaatcttccgtttttcttttatgccacacagtgcatgtttttctacctgtctt
atttttagcataatttagaaaaacaaaacaaaggctgttttcttaattttggcatgaacccccctgttccaaatgaagacgg
catcatcacgaagcagctccaaaaggaaaagcttggcaggtgccctcgtcctggggacgtggagggtggcacgggtccc
gcctgcaccagtgccgtcctgctgatgtggtaggctagcaatatttggtaaaatcatgtttgtggccgaacggggccctgc
accg

DEFINITION Homo sapiens HMG-box containing protein 1 (HBP1), mRNA.

ACCESSION XM 027193 SEQ ID NO:51

Agcaccataacatggtgtgggaagtgaagacaaatcagatgcctaatagcagtacagaaactcctgttggatggacaag
agagcctcaggaatgaatgactcattggagttgctgcagtgaatgagaattgccatcttcacctggatataactcctgtgat
gaacacatggagcttgatgaccttctgaacttcaggcagttcaagtgtacctacccaatctggcatgtaccagctgagttc
agatgtttcacatcaagaataccaagatcatcttgaacaaaataacctcagacataccagaaactacttaccgtgaaaatg
aggtggactggctaacagaattggcaaatatcgcgaccagtcacaaagtccactgatgcagtgtcattttacaatagatca
tctcctgtacacatcatagccactagcaaaagttaattcctatgcacgccctccaccagtgtcctcttctcgaagagtgaac
cagccttccctcatcaccattggaaggaggaaacaccagtaagacacgaaaggcgaatagtgaagcagaatctggcattt
tctgcatgtcctcctgtcagatgatgatgattgggatgggtgcaattcctggccttcaactgtctggcactgtttttgaaaggc
acacgactgtgtttcataagggaagcaataagggaatggcaagatgttgaaattttgctagagctgaaggctgtgataatga
ggaagatcttcaaatgggcatcacaagggtatggtctgatggtctaaagttgttatcatgaagaaagtgtatcatttggc
gagctgtactgaagttgacttttgatcctggtagtagaagatggttacttaccgtagagtgaagctggaccacctttct
atgttaaaaataaagggttggcatcatttatccaagcttgactgtggtacagcatggcattccatgttgtgaagttcatattggc

gatgtatgtctacctctggacaccccgatgccattaattttgatgattcaggtgttttgatacatttaaagctatgacttcaca
cctatggattcttctgcagtttatgtgttaagtagtatggctcgccagcgtcgtgcatctttgtcttgaggacctggtggtca
agactttgcaagatctggattcagtaaaaactgtggctcacctggatcatcacagctcttccaattctttgatgtctaaagctg
tcaaaaaccacagctcagggactgtgagtgccacttctcctaataagtcaaaagaccaatgaatgccttcagcttttgcca
aaaaatacagagttgaatatactcagatgtatccagggaaagataacagagccataagtgtgatccttggtgacaggtggaa
gaaatgaagaatgaagagagaagaatgtacacattagaagcaaaaggctttggctgaagaacagaaacgtttaaatcctga
ctgttggaaaggaaaaagaaccaattcaggctcacaacaacattaaaccaggatgcttatgttcttaagtctatattgcatata
cattgactcttgatggaaagacttaagaagatcaaggctcaccatttgcctcaattcgtgtgaccataagatactgatagcat
tgagtcttgaaatgatttaataatagtgaggattgctttctcattagagcattaagctaaaactatcaacatttaaaccaa
attgccttattttcttccaaactcatatatgtctatcaggaataataggcttgaattgatacctgtggtgtcaaagtacagt
agaaagagaggagaagtgtatacatgtttattttaaattgtacgaaaggggaatttaaaaaatgtactgctgtttatacatt
ggctccttactgcttattaatctgtattgtacacatgatgaaatgaagcagaagctgggagtcggccttctctagtaaccacc
acatggctcagcatctgtgccaacataggcgtcctagtctggctcagtgccaagaggctaccagaacatggggcaggtg
gctggtgttggtgtcccagccaaagagccacctgctgcagttaccatggcatgctgagttgatgcaccaggtggcagcagc
catccgttattttccaatggagacctagcccaggccaaggtaagttagtttaatagcattgggatatagtcactgtaatggtg
ctattaacaaacagtcacaccattgtatttttaacttcgtgttctgtatctcctcagccatgtatcttaaatattttgtcatcata
atctttatggtggggcgagactttgcacttactgcagtgcaacacttgcactttaatttctccaactgtctaaaattagagcaa
atacattgcaatacagctgcttttgcctgtgagctacaatcatggctttcatgttacttaccagtggtgtttctggttaggaatc
acagctgtaaaattgatttcagttcatcacacttctcatgatgttgccttaattttgcacactatattctgtatattttcaaat
aaatggaaaaa

DEFINITION Homo sapiens lymphoid enhancer factor-1 (LEF1) mRNA, complete cds.

ACCESSION AF288571 SEQ ID NO:52

Aagatctaaaaacggacatctccaccgtgggtggctccttttcttttcttttccacccttcaggaaagtgagcgtttcgtta
tcttctgatccttgcaccttcttttggggaacggggcccttctgccagatccctctcttttctcgaaaacaaactactaagt
cggcatccggggtaactacagtggagaggggttccgcggagacgcgccgccggacctcctctgcactttggggaggcg
tgctccctccagaaccggcggttctccgcgcgcaaatccggcgacgcgggggtcgggggtggccgccggggcagcctc
gtctagcgcgcgccgcgagacgccccggagtcgccagctaccgcagccctcgcgccagctgccttcggcctcgg
ggcgggcgcctgcgtcgggtctccgcgaagcgggaaagcggcgccgccgggattcgggcgccgcggcagctgctc
cggctgccggcgccggccccgcgtcgcgccccccgcttcgcccgctgtctgtgcacgaaccttccaactctcctt
tctccccacccttgagttaccctctgtctttcctgtgttgcgcgggtgctccacagcggagcggagattacagagccg
ccgggatgccccaaactctccggaggaggtggcggcggggggggacccggaactctgcgccacggacgagatgatc
ccctcaaggacgagggcgatcctcagaaggaaaagatcttcgccgagatcagtcacccgaagaggaaaggcgatttagc
tgacatcaagtcttcttggtgaacgagctgaaatcatccggccagcaacggacacgaggtggccagacaagcacaaa
cctctcaggagccctaccacgacaaggccagagaacaccccgatgacggaaagcatccagatggaggcctctacaacaa
gggacctcctactcagattattccgggtacataatgatgcaaatatgaataacgacctatacatgtcaaatggatctctttct
ccacctatcccgagaacatcaataaagtgccttgggtgcagccatcccatcggtccatcctctcaccctctcatcactt
acagtgcagagcacttttctcaggatcacaccgtcacacatcccatcagatgtcaactcacaacaggcatgtccagaca
tctccagctcctgatatccctacttttatcccttgcctcgggtggtgttgacagatcacccacctcttggctggcaagggt
cagcctgtatatcccatcacgggtgattcaggcaacctaccatcctcactgtcagtcgacacttccatgtccaggtttcc
catcatatgattcccggctccttgggtccccacacaactggcatcctcctcagctattgtaacacctcaggtcaaacagga
acatccccacactgacagtacctaatagcagtggaagcctcagcatgaacagagaaaggagcaggagccaaaaagacct
cacattaagaagcctctgaatgctttatgtatacatgaagaaatgagagcgaatgtcgttgctgagtgactctaaaagaa
agtgcagctatcaaccagattcttggcagaagggtggcatgccctctccgtgaagagcaggctaaatattatgaattagcac
ggaaagaaagacagctacatatgcagctttatccaggctgggtgtgcaagagacaattatgtaagaaaaagaagaggaag
agagagaaactacaggaatctgcatcaggtacaggtccaagaatgacagctgcctacatctgaaacatggtggaaaacga
agctcattcccaacgtgcaaaagccaaggcagcgacccccaggaccttcttgagatggaagctgttgaaaaccagactg

aggagtaccaggacgccttcttcaacgaactcaaaggcgagaccatggacacctctgagttggatgcatccccga
ccccaccctgtttccaccaggttctgacactgtgactctgtataaatgggtgggaagctgcaaaaaaaaaaaaaaaaa
aaa

Wnt target genes:

DEFINITION Homo sapiens achaete-scute complex (Drosophila) homolog-like 1
(ASCL1), mRNA.

ACCESSION NM_004316 SEQ ID NO:56

Cccgagaccggcgcaagagagcgcagccttagtaggagaggaacgcgagacgcggcagagcgcgttcagcactga
cttttgctgctgcttctgttttttttcttagaaacaagaaggcgccagcggcagcctcacacgcgagcggcagcgt
ccgaagccaacccgcgaaggaggaggggagggagggagggagggcggtgcagggaggagaaaaagcattttcacc
tttttgctcccactctaagaagtctcccggggattttgtatataatttttaactccgtcagggctcccgttcatatttctttt
ccctctctgttctgcacccaagttctctgtgttccccctcgcgggccccgcacctcgcgtcccggtatcgtctgattccgc
gactccttgccggcgcgtgcgcgtgaaagctctgccaagatggagagcggcgccggcggcagcagccccagccgca
gccccagcagcccttctgcccggcgcagcctgtttctttgccagggcgccagcggcgggcgagccggcgagcgcgcg
gcagcgcagagcgcgcagc
gcgcccgagcggcagccctcagggggcggtcacaagtcagcggccaagcaagtaagcgacagcgtcgtcttcgcc
gaactgatgcgtgcaaacgcggctcaacttcagcggcttggtctacagcctgccgcagcagcagccggcggcgtgg
cgcgccgcaacgagcgcgagcgaaccgcgtcaagttggtcaacctgggcttgccacccttcgggagcacgtcccaa
cggcgccggccaacaagaagatgagtaaggtggagacactgcgctcggcggtcagtagcatccgcgcgtgcagcagct
gctggagcagcatgacgcggtgagcggcgccctccaggcagggcgtcgtcgtccaccatctccccaaactactccaacg
actgaactccatggccggctcggcggtctcatctactcgtcggagcagggctcttacgaccgctcagccccaggagc
aggagcttctcacttcaccaactggttctgaggggctcggcctggtcagggcctggtcgaatggactttggaagcaggg
tgatgcacaacctgcatttttagtgctttctgtcagtggttggtggagggggagaaaaaggaaaaaagaaagaaga
agaagaagaaaagagaagaagaaaaaacgaaaacagtcaccaacccatcgccaactaagcgaggcatgcctgaga
gacatggcttcagaaaaacgggaagcgtcagaacagtatcttgcactccaatcattcacggagatatgaagagcaactgg
gacctgagtcaatgcgcaaaatgcagcttgtgtgcaaaagcagtggtccttgccagaaggagcagcacacgcgttata
gtaactcccatcaccttaacacgcacagctgaaagtcttgcctgggtcccttcacctccccgccctttcttagagtgcagtt
cttagccctctagaaacgagttggtgtcttc

DEFINITION Homo sapiens achaete-scute complex-like 2 (Drosophila) (ASCL2),
mRNA.

ACCESSION NM_005170 SEQ ID NO:57

Gggcgtgagaaaggcgacggcgggcgggcgaggagggttatctatacatftaaaaaccagccgcctgcggcgccct
gcggagacctgggagagtcggcgccgcagcgcgggacacgagcgtcccacgctccctggcggtacggcctgccacc
actaggcctctatccccgggctccagacgacctaggacgcgtgccctggggagttgcctggcgggcgccgtgccagaag
cccccttggggcgccacagttttcccgctgcctccgggttccctgcctgcaccttccctgcggcgcgccgggacctggagc
ggcggggtggatgcaggcgcgatggacggcgccacactgccaggtccgcgccccctgcgcccccgctccctgtcggc
tgcgtgcccggcgagaccgcgtccccggaactgttgcgtgcagccggcgggcgggcgaccggccaccgcagagac
cggaggcggcgagcggccgtagcgcggcgcaatgagcgcgagcgaaccgcgtgaagctgggtgaactgggcttcc
aggcgtgcggcagcacgtgccgcagggcgccagcaagaagctgagcaaggtggagacgctgcgtcagccgtg
gagtacatccgcgcgtgcagcgcctgttggccgagcacgacgccgtgcgcaacgcgtggcgggagggtgaggcc
gcaggccgtgcggcgctgcgccccgcggcgccagggaccacccggctgcgcctcgcctcccgcttcttc
gtccccggggcgggggcagctcggagccggctccccgcgttccgctactcgtcggagcagacgggtgcgaagg
cgcgctgagtcctgcggagcgcgagctactcgaacttccagctggttaggggctactgagcggcctcgaccta

DEFINITION Homo sapiens fibroblast growth factor 5 (FGF5), mRNA.

ACCESSION XM_054589 SEQ ID NO:58

Tcttccccctctcccccttcttccccaggctatgtccaccgggtgcggcgaggcgggcagagccagaggcacgcagc

cgcacaggggctacagagcccagaatcagccctacaagatgcacttaggacccccgcggctggaagaatgagcttgcct
tcctcctcctcctcttctcagccacctgatcctcagcgccctggggtcacggggagaagcgtctcgcccccaggggcaac
ccggaccgcgtgccactgataggaaccctagaggctccagcagcagacagagcagcagtagcgctatgtcttctcttctg
cctcctcctccccgcagcttctctgggcagccaaggaagtggcttggagcagagcagttccagtggagccccctgggg
cgccggaccggcagcctctactgcagagtgggcatcggtttccatctgcagatctacccggatggcaagtcaatggatcc
cacgaagccaatatgttaagccaagttcacagatgactgcaagltcagggagcgtttcaagaaaaatagctataatcctatg
cctcagcaatacatagaactgaaaaaacaggggcgggagtggatgtggccctgaataaaagaggaaaaagccaaacgagg
gtgcagccccgggttaaaccccagcatatcttaccatttttgccaagattcaagcagtcggagcagccagaactttcttt
cacggttactgttctgaaaagaaaaagccacctagccctatcaagccaaagattcccccttctgcacctcggaataacca
actcagtgaatacagactcaagtttgccttggataatattccttcttggccttctgagaaccattctttccccctcaggagtctt
ataggtgtcttcagagttctgaagaaaaattactggacacagcttcagctatacttacactgtattgaagtcacgtcatttgttc
aatgtgactgaacaaaaatgtttttgataggaaggaaactggaattcttctactaatacagggagcacactccttcagttcag
caagacataaagccttttgccttctgcttggaggtatitagaacttctgattttcggaagttaataacagggtactcgtatttt
ctgactttacagattaacctgaagaacatacatgatacattttatitgttttccaaagaatattttgatgcagataaaatatttt
gttaacttttgttttttgtttgttttcttaaaagtacctctgcattgagcatattttctacttttatttttaattaatgacataagc
aatcattttatgctgtttatgaattataaatgtgtttatagctcatttgaatatggaaatctttacattttcctattcactgcacttttt
attgtttttatttctagccatacctcagataatatgttttagtttaccattttaaagtgttaaatctctttcacagcaccaaaggctca
gcttggatttgtgtatgtgtatgcaattcatgacattatgtggaatcctaaaccttgggtggctgggatgatgggttagaa
gcaaggagaaaaataaggacttttgatggaattaaatgtgggaggttaaggaaaaggatttagaggtaaaagtacactaag
tttgcaacattattgagatctaagctgtcttgccttacttctctttatctcccccttgcctcattcttgaacagctggaggaat
acattttatctgtccatgaagcatacactatgaattcaagtgtttaaataacttctatgactctctgctatcccactgtatagat
ccacagggagcaaacacttagaatgatagagaactgaaggagatcaatggtttaacagttatccatgccaagtcctcattgt
cagaaatattcttattactcagtcacacactctttagcttcccttctaaaggtaaccaatccagtgaatagatgtgccctttat
aaggaaactctgatgtttattaaaaaaactggccttttgatagaggttaacttaatttgggaatttgtgtgtgaaatggcatttaa
tttaacctaaatactgactgctggacataaaacacagaaaaatfaacttaagaaaatttataaaatttattctcaggtaatcatttt
aataaagttctgcaaaatacacgtttatcttaccatcagaaatgtggcaaaaaaggcatagctaaaggctaaacatatggcttt
agtagtaacaaaagggttcatagaacttcaggttgcatttaaacatgtttaaagtgtacttataaactattttttctaaagca
aactatgatttttttggcgcacaaatacaaaagtggaaacttaccaaaattgaactagctaccatataagcagattgctttaatt
gatgggaaaatagtacacacatatatacaaaataatataaaaaaacccatccatcaactaaaacattatatgtatacatca
gtatagtgtttattataaagccaattatctgattaagcattcttccactgaatgcataatgtttaaatagcataaaatgaaatgct
acaaaaattgaactaatttatactttaaagtattctgggttaaatgaaacaatgaaatttttagtatgttcaactctcatccaaatg
gcatatgacctgtttacacagcctaaagctaaaaatattactctagttatttctaattctattgttaagtattgtgcactgtatacca
agttcttagggcacatgaaaaattttagctgccaacaggaactagtaaacatatgttcttaataagtgaagggaagataat
aatgatgtgcaacaataagccacgtcaatgcataagttgtataggctaaatgttgcctttaggtctacattaaactcaaatgtaat
agttatcttatactcctggttgatttgattgacatattaacgtgaaagtaggatagctactaaatatattatgcaagtcaggaa
tcattaatttcaaaatttaaagccatgctaaaattaaaaagaaaatattaaattacacaattacacttgcctttactggccatacaa
aatgattttttttttttgagacagagcttctgtctgtcaccaggctggagtgagtgccatgatctcggtcactgcaacctc
caactccctgggttaagggttctctgcctcagcctcccaagtagctgggattacagactcatgccaccacgccagctaattt
ttgtatttttagtagagacgggggttcaccatgttggcaggatggctcctcctggcctcttgatagctcctgacctatgatct
gcccacctggcctccccaaagtgtgggattacaggtacaatgatgtataaataatgottagtgaagcataaagggttacctac
atcaattaattaaatgaacttatgtacagaaaacatgtataaataaagcttactaataatgcttacaacttttaagagggttcttg
cttatgtagctttttatttttaagtaactagaaccaccaaatcaataaaaatttttggttatggttatgttcatctaaacacaa
caataacttttataatatttaggagctattttgtctataggtgacaaacatctccagactaacatgtcagttttatcaattatatt
atgtttaatttttaagatttctttatgtggaacatctatagagataaataagaattttcaataagatgtagtaacactgtgatttatct
ttcaagagctctcttccacttcccttaagagactaatttgagagtagaggtgcataattaattttcttgggttcttcagctgaattat
attgttcagaagttcaaaatcatgtgacaataataagggtactgacagaagttatttccaagtttgtgtatatattataaaaatt
acatatataaaactaaggccttttttctgttatttttaagcttttatttctgtagctaaaaataaaacatcataaattctggttaggtaa

atttcttattaaatcaatcttgaaatagaaaatgtaataactttctaccattaacatttttacccttccatagaaggagggaata
aatcatgacttatccattttcaataacaaaacgaaactatggcactaaccaaaaacttgcattctggcataattttacagtgc
agagaattgtttctgggctcattaaaaaagtagtattgcagacattgctgcaatgggaagcagacaataacttctaaaggaa
ttctacacctcctttaagattacttaattgctacatctaaattctgataatttaaaatccattttagggtataaaatttttaaaagt
gaaggaaacctctggataaatggacaaggcctaattttttttagtcaatccaactgtactggccaatttttgaaataagatta
tatgattaggtattagcagagacaaagagttacctcctccatcttactctgccctatttgaaagtctcaggggagaaaaggaa
caagatgctgatccaacctgagtgaggatcaggtgaggtacatttaccatctaagaatttttttaaaattttattattatacttcaa
gttctagggtacatgtccacaatgcacatgtctgtcacacatgcacacatgtgccatgctggtgtgctgcacccaccaacctg
tcatccagcattaggtatatctctaattgctatccctccccctccacccacccacagcaggccccggtagtgatgttcccc
ttcgtgttccatgtgttctattgttcaattcccacctatgagtgaagaatgtggtgtttgttttggctccttgcatagtttgctg
agaatgatggtttccagcttcatcatgtccctacaaagaacatgaactcatcattttgatggctgcatagtattccatggtga
tatgtgccacatttttaatccagctctatcattgttgacatttgggttgggtccagctttgctattgtgaatagtgcigcaataaa
catatgtgtg

DEFINITION Homo sapiens muscle segment homeobox 1 (MSX1) gene, complete cds.

ACCESSION AF426432 SEQ ID NO:59

Tgcgtgccccaggcccagcgcgctccgggagagtcgccagcgcggccaatggatcgtccgggcccgc
ctcgcgcgctgattggccgcccccgcctcgccttattagcaagtctctggggagccgcggtaggggccggagc
cggcgagtgtcccgggaactctgcctgcgcggcggcagcgaccggaggccaggcccagcacgccggagctggcctg
ctggggaggggcgggaggcgcgcgggagggtccgcccggccaggggccccgggcgctcgcagaggccggccgc
gtcccagcccggggagcccatgcccggcggtggccagtgtcgcggcagaagggggggcccggtctgcatggc
cccggtgtgtacatgacttcttgcactcgggtgtcaaagtggaggactccgcttcggcaagccggcgggggaggcg
cggggcaggccccagcgcgcggccacggcagccgcatggcgcgagcaggagggggccaagcccaaag
tgtcccttcgctcctgcccttcagcgtggaggcgctcatggccgaccacaggaagccgggggccaaggagagcgccct
ggcgccctccgaggcggtgcaggcggcggggtggctcggcgagccactggcggtcccgggggtcgtgggagccc
cggacgcgccctcttcgcccggcggtcggccatttctgggtgggggactcctcaagctgccagaagatgcgtcgtc
aaagccgagagccccgagaagcccagaggaccccggtgatgcagagccccgcttctcccgcggccggccaggcg
gtgagccccccagcctgcacctccgcaaacacaagacgaaccgtaagccgaggacgcccttcaccaccgcgcagct
gttggcggtggagcgcaagttccgccaagaagcagtagcttccatgccgagcgcgcggagtctccagctcgtcagcc
tactgagacgcaggtgaagatatggttcagaaccgcccgcgccaaggcaagagactacaagaggcagagctggaga
agctgaagatggccccaagcccatgtgccaccggctgccttcggccttcttccctctcggcgccccgcagctgtag
cggccgcggggtgctcgtctacgggtcctctggccccctccagcgcgcgcgctgctgtggcgcccggtgggact
ctacacggcccatgtgggtacagcatgtaccacctgacatagagggtcccaggctgccacactgtgggagccgattc
ctccagccctgggtgtgtacccccggacgtgtccctgctcggcaccgcccagccgcttcccttaacctcacactgtc
cagttcacctcttctcctgagttcactctccgaagtctgatccctgccaaaaagtggctggaagagctcccttagtactct
ctagcatttagagatctacctctcaggttaaaagtggggaaactgagggcagagaggttaacagatttatctaaggtcccc
agcagaattgacagtgtgaacagagctagaggccatgtctcctgoatagttttccctgtcctgacaccaggcaagaaagcg
cagagaaatcgggtgtgtgacgattttggaatgagaacaatcaaaaaaaaaaaaaaaaaaaaaaaaaagaaaagagaaa
aaaaagactagccaccaggaagatgaatcctagcttctccattggaaaatttaagacaagttcaacaacaaacatttgc
ctggggggcagggaacacagatgtgtgcaaggttaggtgaaggga

DEFINITION Homo sapiens neurogenin 1 (NEUROG1), mRNA.

ACCESSION NM 006161 SEQ ID NO:60

Atgccagcccgcttgagacctgcatctccgacctgactgcgccagcagcagcggcagtgacctatccggcttctcac
cgacgaggaagactgtgccagactccaacaggcagcctccgcttcggggccgcccgcgcggccccgcaggagcgcgc
ccaatatctccggcgctgtgaggtccaggggcacaggacgacgagcaggagaggcgggcgccggcgccggcgacg

cggttcgctccgagggcgtgctgcactcgtgcgcaggagccggcgctcaaggccaacgatcgcgagcgcaaccg
catgcacaacttgaacgcggccctggacgcactgcgcagcgtgctgccctcgttccccgacgacaccaagctcacaaaa
tcgagacgctgcgcttcgcctacaactacatctgggctctggccgagacactgcgcctggcggatcaagggtgcccggg
ggcgggtgcccgggagcgctcctgccgcgcagtgctccccctgcctgcccgggtccccaagccccgccagcgacgcg
gagtcctggggctcaggtgccgcgcgcctccccgctcttgacccagtagccagccgcctccgaagacttcaccta
ccgccccggcgaccctgtttctccttccaagcctgcccgaagacttgctccacacaacgcctgtttcattccttaccacta
g

DEFINITION Homo sapiens neurogenin 2 gene, partial cds.

ACCESSION AF303002 SEQ ID NO:61

Ggcctccccgccttggcggccctgaccccgtgtcatccagcgccgacgaagaagaggaggaggagccgggcgct
caggcggggcgctcggcagcgccggggtgagccgggagggggcgcgggggcgcggtggctcgggtgaggag
ggctcggggcccgacggctgctgggtctgttacacgattgcaaacggcgcccttccgggcgcggggctctcccgag
gcgccaagacggcgagacgggtgcagcgcatcaagaagaccgtagactgaaggccaacaaccgcgagcgaaaccg
catgcacaacctcaacgcggcactggacgcgctgcgcaggtgctccccacgttccccgaggacgccaagctcacaa
atcgagacctgcgcttcgccacaactacatctgggcactcaccgagacctgcgcctggcggatcactgccccggcg
gccccggggcctgccggggcgctcttctcgaggcagtggtgctgagccgggaggagccagcgccgcctgagc
agcagcgagacagccccctgcccgcctccacgtggagtgaccaaagccccgcgcctcctcctcgtgtcctccaa
ttccacctccccctacagctgcactttatgcccgccagccccggcggtcagacatggactattggcagccccacctcc
cgacaagcaccgctatgcacctcacctccccatagccagggtattgtatctag

DEFINITION Homo sapiens neurogenin 3 (NEUROG3), mRNA.

ACCESSION XM 005744 SEQ ID NO:62

Cctcggaccccatctctcttcttcttcttcttcttgggctgggggcaactcccaggcgggggcgccctgcagctcagctgaacttg
gcgaccagaagcccgtgagctccccacggccctcgtgctcatcgtctcttcttcttcttgcgccggtagaaaggatgacg
cctcaaccctcgggtgcgcccactgtccaagtacccgtgagacggagcggtccttccccagagcctcggaagacgaag
tgacctgccccacgtccgccccgcccagccccactcgcacacgggggaactgcgcagaggcggaagagggaggctgc
cgagggggccccgaggaagctccgggcacggcgcggggggacgcagccggcctaagagcgagttggcactgagcaagc
agcgacggagtgccgaaagaaggccaacgaccgcgagcgcaatgaatgcacaacctcaactcggcactggacgcc
ctgcgcggtgtctgcccaccttcccagacgacgcgaagctaccaagatcgagacgctgcgcttcgccacaactacat
ctgggcgctgactcaaacgctgcgcatagaggaccacagctgtacgcgctggagccggcgccgcgactgcgggga
gctgggcagcccaggcggttccccggggactgggggtcccttactcccagcttcccaggctggcagcctgagtc
gccgcgtcgtggaggagcgacccgggctgctgggggacacctttccgctgcttgagccaggcagcttggtttctca
gattttctgtgaaaggacctgtctgtcgtgggctgtgggtgctaagggtgaaggagagggagggagccgggagccgtag
agggtggcgacggcgccggccctcaaaagcactgttcttctgcttctcctgggtgaccttggccggccaggcctc
cacggggggcgagggctgggttcattccccggccctccgagccgcgccaacgcacgaacccttgcgtgctgcccgcgc
gaagtgggcatgtgaaagtgcgctcattttaggcctcctctgccaccacccataatctcattcaagaatactagaatggt
agcactaccggcgccggagccgcccacgcttgggtcgcctaccctcactca

DEFINITION Homo sapiens phosphatase and tensin homolog (mutated in multiple
Advanced cancers 1) (PTEN), mRNA.

ACCESSION NM 000314 SEQ ID NO:63

Cctccccctgcccggcgcggtcccgctcgcctcgcctcccgctccccctcggtcttccgaggcgccccgggctcc
cggcgcgggcgaggggggcgggcaggccggcgggcggtgatgtggcaggactcttatgcgctgoggcaggatac
gcgctcggcgctgggacgcgactgcgctcagttctcctctcgggaagctgcagccatgatggaagttgagagttgagcc

gctgtgaggcgaggccgggctcaggcgagggagatgagagacggcgggcgccgaggcccgagccctctcagcgc
ctgtgagcagccgcgggggagcggccctcggggagccggcgccgctgcggcgggcgagcggcggttctcgct
cctctctgtcttttctaaccgtgcagcctcttctcgttctcctgaaagggaggtggaagccgtgggctcggcgagg
ccggctgaggcgcgccggcgggcgggcgccacccctcctcgttggagcgggggggagaagcgggcgggcgggcg
gcccgggcggtgcagctccaggagggggtctgagtcgctgtaccatttccagggtgggaacggcgagagttgg
tctctccccttctactgcctccaacacggcgggcgggcgggcgccacatccagggacccggcggtttaaactcccgt
ccggcgccgcgcacccccgtggcccggtcgggagggcgccggcgaggcagccgttcggaggattatctcttctc
tccccattccgtgcggcggtcggagccctctggtgctgaggagaagcaggccagtcgctgcaaccatccagcagcc
gccgagcagccattaccgggtgcggtccagagccaagcgggcgagcagcagggggcatcagctaccgccaagtcc
agagccatttccatcctgcagaagaagccccgccaccagcagcttctgcatctctcctccttttctcagccacaggctc
ccagacatgacagccatcatcaagagatcgttagcagaacaaaaggagatatcaaggaggtgattcagcttagactg
acctatatttccaaacatttctgtatgggatttctgcagaagacttgaaggcgtatacaggaacaattatgatgtagt
aagggttttgattcaaaagcataaaaaccattacaagatatacaatcttgtgctgaaagacattatgacaccgccaatttaatt
gcagagttgcacaatatcctttgaagaccataaccaccacagctagaacttatcaaaccttttgaagatcttgaccaat
ggctaagtgaagatgacaatcatgttgacgaattcactgtaaagctggaaaggacgaactgggtgaatgatattgtcatat
ttattacatcggggcaaattttaaggcacaagaggccctagatttctatggggaagtaaggaccagagacaaaaggga
gtaactattcccagtcagaggcgctatgtgtattattatagctacgtttaaagaatcatctggattatagaccagtggcactgtt
gtttcacaagatgatgttgaaactattccaatgttcagtgggcggaacttgcaatcctcagtttgggtctgccagctaaagggtg
aagatatattcctccaattcaggaccacacgacgggaagacaagttcatgtactttaggttccctcagccgttacctgtgtgt
gggtgatatcaagtagagttcttcacaaacagaacaagatgtaaaaaaggacaaaatgtttcacttttgggtaatacattc
ttcataccaggaccagaggaaacctcagaaaaagtagaaaatggaagtcattgtgatacaagaatcgaatgatttgcagta
tagagcgtgcagataatgacaaggaatatctagttactttaaacaataatgatcttgacaaagcaataaagacaaagcc
aaccgatacttttccaaatttaagggtgaagctgtacttcacaaaaacagtagaggagccgtcaaatccagaggctagcag
ttcaacttctgtaacaccagatgttagtgacaatgaacctgatcattatagatattctgacaccactgactctgatccagagaat
gaacctttgatgaagatcagcatacacaattacaaaagtctgaattttttatcaagagggataaaacacatgaaaataa
actgaataaactgaaaaatggaccttttttttaaggcaataggacattgtgtcagattaccagttataggaacaattctcttt
cctgaccaatcttgtttaccctatacatccacagggttttgacacttgtgtccagtgaaaaaagggtgtgtagctgtgtcatgt
atataccttttgtgtcaaaaggacatttaaaattcaattaggattaataaagatggcactttccggtttattccagtttataaaaa
gtggagacagactgatgtgtatagtaggaatttttctttgtgtctgtcaccactgaagtggctaaagagctttgtgat
actggttcacatcctaccccttgcacttgtggcaacagataagttgcagttggctaaagagaggtttccgaaagggtttgtac
cattctaattgcattgattcgggttagggcaatggagggaatgctcagaaaggaaataatttatgctggactctggaccatat
accatctccagctatttacacacaccttcttagcatgtacagttattaatctggacattcgaggaattggccgtgtcactgc
ttgtgtttgcgcatttttttaagcatattgtgtgtagaaaggcagctaaagggaagtgaatctgtattgggttacaggaatg
aaccttctgcaacatcttaagatccacaaatgaagggatataaaaataatgtcataggtgaagaacacagcaacaatgactta
accatataaatgtggaggctatcaacaagaatgggcttgaacattataaaaattgacaatgatttataaatgttttctcaa
ttgtaaaaa

Table 2 Polycomb Group.

EED

SEQ ID NO:64

>gi|14523051|ref|NM_003797.1| Homo sapiens embryonic ectoderm development (EED), Mrna

GAGGGAAGTGTGCGACTGCGCCGGCGGGAACAGACATGCCTGCGGCCAAGAAGCAGAAGCTGAGCAGTGAC
GAGAACAGCAATCCAGAACTCTCTGAGACGAGAATGATGACGCTGTGAGTATAGAAAGTGGTACAAACA
CTGAACGCCCTGATACACCTACAAACACGCCAAATGCACCTGGAAGGAAAAGTTGGGGAAAAGGAAAATG
GAAGTCAAAGAAAATGCAAAATATTCTTCAAATGTGTAAATAGTCTCAAGGAAGATCATAACCAACCATG
TTTGGAGTTCACTTTAACTGGCACAGTAAAGAAGGAGATCCATTAGTGTGTTGCAACTGTAGGAAGCAACA
GAGTTACCTTGTATGAATGTCTTCAAGGAGAAATCCGGTTGTTGCAATCTTACGTGGATGCTGATGC
TGATGAAAACCTTTTACACTTGTGATGGACCTATGATAGCAATACGAGCCATCCTCTGCTGGCTGTAGCT
GGATCTAGAGGCATAATTAGGATAATAAATCCTATAAATGCAGTGTATAAAGCACTATGTTGGCCATG

yy1

SEQ ID NO:65

[illegible]

CBX1

SEQ ID NO:66

CTGCCAGAGATGAGTGCAGGTGAGGAGAGTAGCAGCTCGGACTCCGACCCCGACTCCGCCTCGCCGCCCA
GCACTGGACAGAAACCATCAGTGTCCGTTACAGACCAGCCAGGACTGGAAGCCCAACCCGCAGCCTCATCGA
GCACGTATTTGTCACCGACGTCACCTGCCAACCTCATCACCGTCACAGTGAAGGAGTCTCCCAACAGCGTT

GGCTTCTTCAACCTGAGGCATTACTGAAGCCCCGGCGCCACCAGCTGCGCGTCTTACTCCCCTTCCCTGC
CTATGGTGTGCTTGGCTAAGTGACTCCCAGCCCCAAGCCCCCTCAAGAGTCTGATCGTGGGGGAGGAGG
AGTGGG
<u>CBX6</u>
SEQ ID NO:67
Attatgggctgtgggtgccgctgagcaagatggagctgtctgcagtgggcgagcgggtct
Tcgcgccgaatccatcatcaaacggcgatccgaaagggacgcacagctacctgggtga
Aatggaaggggtggcgatcaagtacagcacttgggagcccgaggagaaacatcctggact
Cgcggctcatttgagccttcgaacaaaaggagagggagcgtgagctgtatgggccaaga
Agaggggacccaaacccaaaactttcctcctgaaggcgcgggcccaggccgagggcctcc
Gcatcagtgatgtgcatttctctgtcaagccgagcgccagtgccctcctcgcccaagctgc
Actccagcgagccgtgcacccggctcaagaaggacatccgcgctgccaccgtatgtccc
Gccgtcccctgccccgccggacccgcaggggggcagccccggactgcgccgcccattt
Cgccctctcggagacggtgcgcacatcatcaaccgcgaaggtgaagccgcgggagcccaagc
Ggaaccgcacatcctgaacctgaaggtgatcgacaagggcgctggcgcgggggcgccg
Ggcagggggcgggggcgctggcccgccccaaagtcccctcgcggaaccgcgttataggca
Agagcaagaagttcagcgagagcgtcctgcgtacacagatccgccacatgaagttcggcg
Cctttgcgctgtacaagcctccgcgcccccctggtagcccggtcccccgcaaggctg
Aggcctcagccccgggcccctgggctacttctggcgcccccgccccctacgacgcc
Gcagctctggctcctccggctgccccctcgccctacaccacagtcctctgaccccgacgaca
Cgcccccaagctcctccccgagaccgtgagcccatccgccccagctggcgcgagccgg
Aggtgctcgacctgtccctcctcccgagtcggcagccaccagcaagcgggcaccgcctg
Aggtcacagctgctgcggcccgccacctcccacggccccctgagcccgccggtgctcct
Ccgagcccgaggtgggactggcgccccgagatgtcacctgctccaatgtgggtcgtca
Ccgatgtcaccagcaacctcctgacgggtcacaatcaaggaattctgcaacctgaggatt
Tcgagaaggtggctgctgggtagcagggcgccgctggggcggtggcagcattggggcga
Gcaagtga
<u>HPC2 (CBX4)</u>
SEQ ID NO:68
>gi 4503032 ref NM_001880.1 Homo sapiens activating transcription factor 2 (ATF2), mRNA
GAATTCTGTGATAAGTTATTCAACTTATGAAATTCAGTTACATGTGAATTCTGCCAGGCAATACAAGGA
CCTGTGGAATATGAGTGATGACAAACCCCTTTCTATGTACTGCGCCTGGATGTGGCCAGCGTTTACCAAC
GAGGATCATTTGGCTGTCCATAAAACATAAATGAGATGACACTGAAATTTGGTCCAGCACGTAATGACA
GTGTCAATTGTGGCTGATCAGACCCCAACACCAACAAGATTCTTGAAAACTGTGAAGAAGTGGGTTTGT
TAATGAGTTGGCGAGTCCATTTGAGAATGAATTCAAGAAAGCTTCAGAAGATGACATTAATAAATGCCT
CTAGATTTATCCCCTCTTGCAACACCTATCATAAGAAGCAAAATGAGGAGCCTTCTGTTGTAGAAACAA
CTCACCAGGATAGTCCTTTACCTCACCAGAGTCTACTACCAGTGATGAGAAGGAAGTACCATTGGCACA
AACTGCACAGCCACATCAGCTATTGTTTCGTCCAGCATCATACAGGTTCCCAATGTGCTGCTTACAAGT
TCTGACTCAAGTGTAATTATTTCAGCAGGCAGTACCTTCACCAACCTCAAGTACTGTAATCACCAGGCAC
CATCCTCTAACAGGCCAATTGTCCCTGTACCAGGCCATTTCTCTTCTGTTACATCTTCTAGTGGACA
AACCATGCCTGTGTGCTATTCTGTCATCAATTACAAGTTCTAATGTGCATGTTCCAGCTGCAGTCCCACTC
GTTTCGACCACTCACCATTGGTGCTAGTGTTCAGGAATCCAGGTCCCTCTCTCCCAACCCAGTACAGT
CAGAAGCAAAAATGAGATTAAAGCTGCTTTGACCCAGCAACATCCTCCAGTTACCAATGGTGATACTGT
CAAAGGTCATGGTAGCGGATTGGTTAGGACTCAGTCAGAGGAATCTCGACCGCAGTCATTACAACAGCCA
GCCACATCCACTACAGAACTCCGGCTTCTCCAGCTCACAACTCCACAGACCCAAAGTACAAGTGGTC
GTGGGAGAAGAGCAGCTAACGAAGATCCTGATGAAAAAGGAGAAAGTTTATAGAGCGAAATAGAGCAGC
AGCTTCAAGATGCCGACAAAAAGGAAAGTCTGGGTTTCACTCTTTAGAGAAGAAAGCTGAAGACTTGAGT
TCATTAAATGGTCACTGCAGAGTGAAAGTACCCTGCTGAGAAATGAAGTGGCACAGCTGAAACAGCTTC
TTCTGGCTCATAAAGATTGCCCTGTAAACCGCCATGCAGAAGAAATCTGGCTATCATACTGCTGATAAAGA
TGATAGTTTCAGAAGACATTTCACTGCCGAGTAGTCCACATACGGAAGCTATACAGCATAGTTCCGTCAGC
ACATCCAATGGAGTCAGTTCAACCTCCAAGGCGAAGCTGTAGCCACTTCAGTCCTCACCAGATGGCGG
ACCAGAGTACAGAGCCTGCTCTTTCACAGATCGTTATGGCTCTTCTCTCCAGTCACAGCCCTCAGGAAG
TTGATTAAAAACCTGCAGTACAACAGTTTAGATACTCATTAGTGACTTCAAAGGGAAATCAAGGAAGAC
CAGTTTCCATTTATGCGAAATCTGTGGTTGTAAATTT
<u>HPC3</u>

SEQ ID NO:69

```
>gi|10190681|ref|NM_020649.1| Homo sapiens chromobox homolog 8 (Pc class homolog, Drosophila) (CBX8), mRNA
```

CTGACGTCAGCGGGAGAGTATTATGGTCTGTCTGCTGCGCTGGCTGCTGCTTTTCTGCTCCTGGAAAGCGGCC
TAGGGGGGAAGCGGCGAGTCAACATGGAGCTTTACGCGGTGGGGGAGCGGGTGTTTCGCGGCCGAAGCCCT
CCTGAAGCGGGCGCATACCGGAAAGACGCATCGGAATACCTCGTGAATGGAAAGGATGGTCGCAGAAGTAC
AGCATGGGAACCGGAGGAAAAACATCCTGGATGCTCGCTTGCTCGCAGCCTTTGAGGAAAGGGAAGAGAG
AGATGGAGCTCTATGGCCCCAAAAGCGTGGACCCAAAGCCCCAAACCTTCTCTCTCAAGCGCAGGCCAA
GGCAAAGGCCAAAACCTTACGAGTTTTCGAAGTGACTCAGCCAGGGGCATCCGGATCCCCACCTTGGCCGC
TCGCCCCAGGACCTGGCCTCCACTTCCCAGGGCCCGGGAGGGCCTTCGAAACATGGGTTTGTCCTCCCGCCAG
CGACGACGACGACGACGACGACCTGCCGCGCAGAGGCCCTTCGGGACCGGGACCGAGACCGGGATAG
GACCGGGAGCGGGATCGAAGAAAGGAGAGGAGCGAGAGAGGAGCGGGAACGTCGAGAGGGAACGAGAG
CGGGGTACCAGCAGAGTGGATGACAAGCCCCAGCTCACCGGGGACAGCTCGAAGAAGCGAGGCCCAAGC
CCCGGAAGGAGCTCCCGGACCCCTCACAGAGGCCCTTAGGCGAACCCAGCGCCGGCCTCGGAGAGTACCT
CAAGGGCAGGAAGCTTGAGCGACACCCCTTCCGGGGCAGGAAAGTTTCAGCCGGCCACAGTGTGATCCAG
CTGGCCCCGAAGACAGGACTCGGACCTGGTGAGTGTGGTGTGACCAAGCCCTAGCTCAGCTGAGGCCACCG
GCAAACTGGCTGTGGACACTTCCCAGGCCAGGTGTATAAGCACAGGGCTCCCTTCTGTAGGCCAAAGG
CCAGGGTGCCCTAGATCCCAATGGCACCCGGGTCCGACATGGCTCAGGCCCCCCCAGCTCTGGGGGGGGG
CTGTACCGGGACATGGGGGCCAGGGGGGAAGGCCCTCCCTCATCGCCAGGATCCCTGTGGCCAGAATCC
TGGGGGACCCGGAGGAAGAGTCTTGAGGCCCTCCCTGACTAACCTGGAGAAGGTGGTGTGTCAGGACGT
GACCTCAAACCTTTTTCAGCGTCACCATTAAGGAAAGTAACACGGACCAAGGCTTTTAAAGAGAAAGTA
TGAATGCTGGGTGGGTGTGTCCAGGAGGACAGAGGGGAGAGAGTGAGCGTGAGCTTGGCATAGTGATT
TTATTTCTGGGTGGGATGTGGCCTTTTGGCTGGTCCCGTCCCTGATGTACCCCCACCCACCAGCCCCCT
TTATCCCTCCTTCTCCCCCTCAGTTTTTGTGGAAAGATTATCTCTAGAGTTATATTTCTATTAGAT
GTAATATGTTATTTAAGAAAAATATCTAAATATATATATTTCAACTCGAAAAAAAAAAAAAAAAAACTCG

PHF1

SEQ ID NO:70

```
>gi|13435396|ref|NM_024165.1| Homo sapiens PHD finger protein 1 (PHF1),  
transcript variant 2, mRNA
```

CTCTCTCCTGCCGCTGCCGCTGCTTTGGCTGCTGCGTCATACGCCCCAGAGCCGCCGGGACCGAGGGGGCTG
GGCTCTGGGGACCCCCCGGCCTCCGCCTGCACGCCCCCCCACGCCCGGACGTGCCCTCTCCGCGCGGGGGA
CTCGCCTAGGTCTCTCTACGTCTGCCCCTGCCCGGCTCCCGGCGCGCCCCAGCTGTACCGGCCCCCCCAGG
ATGCAATGGCGCGACCCCCCGGCTGAGCCGCTCTGTTGCCCTCTCACTTTGGGACCCAGCTTCTCTCTGC
TCCACCTCTGGCCCCAGGCCCTCGGCTTTTGGGAGGGTCAAGATGTGCTGCCAGATGGACTGATGGGCTG
CTATACTTGGGTACCATCAAAAAGGTGGACAGTGCTAGGGAGGTGTGTCTGGTCCAGTTTGAGGATGATT
CGCAGTTTCTGTTCTATGGAAGAAGACATTAGCCCTGCTGCCCTCCCTGGAGAGGAACTCCTCTGTTGTGT
CTGTGCTCTGAGACTGTGGTCCCTGGGAACCCGGCTGGTCAAGCTGTGAGAAGTGTGCGCATGCTTATCAC
CAGGACTGCCATGTTTCCAGGGCTCCAGCCCTGGAGAGGAGAGGGCACATCTGGGTATGCGCCGACGT
GGTGTCTTTTGGGATCGCCACCAAGAGGGGAGGTGCCCTGAAGAAGGGCCCCCTATGCCCGGGCCCTGGG
TATGAAGCTTTCTCTGCCATATGGACTGAAGGGGCTGGACTGGGATGCTGGACATCTGAGCAACCGACAG
CAGAGTTTACTGTTACTGTGTGGTGGCCCTGGGGAGTGGAACTGAAAATGCTGCAGTGCCCGAGCTGCCTGC
CAGATGGTGGTTTCCATGAGGCCCTGCACCCAGTCTTGAGCAAGCCCCCTCTCTATGGGGACAGGTTCTATGAATT
TGAATGCTGTGTGTGTGCTCGCGGGGGCTTGAGAAAGTCCCGAGACTACAGCTTCTGCTGGTGGATGTGGCC
CATCTTGTCTGTATCACCTCAGTGTTTGCTGTAAGAAGAAATACTTTGATTTTGATCTGTGAGATCCTCC
CCCTTCACTTCTGAGAATTGGGACAGTTTGCTCCTGGGGGAGCTTTCAGACACCCCCAAAGGAGAAGCTTC
TTTCCAAAGTCTCCTCTCTGCTCTTAAACAGCCACAAGGACCGTTTCATTTTCAGGGAGAGAGATTAAGAAGAGG
TAAATAGTTTGTGTCTCATGCTCCGATGGCTGCCCTCGGTGGAGCCCCCTGAGGAGCCCCCTAGGAGCTGAGGACTCA
CCAGCTTCCCTTCAGGGCCAGGCTCTGGGGAGGGGGTCTACAGTCCCCCTGGGAAGCGCGGGACCGGA
GCCCAGAGCCCTGAGGAGGAGGCGAGAAGGGGAAAGTGGAGGAGCTGGGGCCACCCTCAGCAGTGCGCAAT
CAGCCCGAGCCCCAGGAGCAGAGGGAGCGGGCTCATCTGCAGAGGGGCACTGCAGGCCCTCAGTGTCTCCAC
CATCCCCCAGCCCTAACCAGAGTTACCAAGGGCAGCAGCGGCTACAACCTTCCGCCCCCAGATGCCCGCTG
CCTTGCCCCAGAGCCCCATCCGGATTTTGCTTCTTCCACCTTCTGCCACACCCAGGAGACCTCTGGG
GACAGTGGAGCCCCCAGACAGGTACCCCTGGAACTTTCATTTGGTTTCCCCACAGACATCCCTAAAAGTG
CCCCCCCCACTCGATGACTGCCTCATCTTCTCAGTTTTCATCCCCATCCCCAGGTCTTCTTAGACGCTCAGC
ACCCCTTCTCTCCCCTGTGCGGTAGTTTGTCTCCTGGGACTGGGGGAGGAGTCCGAGTGGGGTTGGTTAC
TTGCTCCCGAGGGGACCCCTGTCCGGGTCTTCTGCACTCGCGAGTACGGCCCTGATGGCTCTGTGCGAGTACCTGG
TTGAGTGGGGAGGAGGGGCGATCTTCTGAACAGCCGTGCTTCTGCCACCTCCCATTCACACACACCGG
ACTTTCATACCTTGACCTCTGACCTCACCTACAGTCAGGTGGGATGTAACTGGAGAGATAGGGGGTAGTTTCTC

CTACTGCCAGGCTGGAATCCAAGAGTGGGGAGTGGGGAAGAGGCCCTCTTCTCTACCTCCTTCATGAT
TCCTGACCCCTCCCATCTTCCCATTTCTTTGATGTTATTTTGTACAGCTTTTAAATATTTTAA
ATTATTTAACCCTGGGGGAGAGACTGAGGAGGAGGATGATAAGGATCCCGGACTCTGTATGATTGA
AATAAAGAGAAATAACAAA
PHF2
SEQ ID NO:71
>gi 4885546 ref NM_005392.1 Homo sapiens PHD finger protein 2 (PHF2), mRNA
GCGGCCGCTCGGCGGCCGGGGTCCCTTCGGTGGGGCCGCGGCTCCCCGCGCGCGCCCCCGCGCTCCA
TTGCTTTGTGTCCCGCGCGCGGCCCGGCCACTCTCAGCCCTGCGCCCCGCGCGCGCGGG
CGGCTCCCGCGCGGCCCGCCAGCAGCCCGCGCGGATTGTGTGGACGCGCCCGCGCGAGCGCGCGCGC
GGGCCCCGCGAGCGCCCCCGGCCCGTCCGCTCCGCGCGCGCGCGCGCGCGCGCGCGCGCGCGCG
TCG
CAACATGGCGAGGCTGCCCCGTGACTGCGTCTGCCGCTGCCCTACGACGTTACCCGCTTTATGATCGAG
TGCGATGCCTGCAAGGACTGGTTCCACGGCAGCTGTGTTGGGGTGAAGAGGAAGAGGCACAGACATCG
ACATTTACCACTGCCCCAAGTGCAGAGAAAACCATGGCAAGTCCACACTCAAGAAAAAGCGGACTTGGCA
CAACACGCGCCCTGGGCCAACACCGGACGTGAACACAGTGCAGAAATGGCAGTCAGCTGTTTATCAAGGAG
CTGCGGAGCCGAACCTTCCCCAGTGTGAAGACGTGGTGTCCCGTGTGCCAGGTAGCCAGCTCACCCTGG
GCTACATGGAGGAGCATGGCTTCACTGAGCCCATCTTGTCCCCAAGAAAGATGGCCTGGGCTTAGCTGT
CCCTGCCCAACATTCTACGTGAGTGCAGTGCAGAACTACGTGGGGCCGGAACGGAGTGTGTGACA
GATGTACCAAGCAGAAGGACTGCAAGATGAAGCTGAAGGAGTTTGTGGACTATTACTACAGCACCACCC
GCAAGCGGGTCTCAACGTCAACACCTCGAGTTCTCTGACACCCGAATGTCCAGCTTCGTGGAGCCACC
TGACATGTAAAGAACTGTCTAGGGTAGAAAACACTGCGCCAGATGATGCATGCTGGCCAAGCCCAA
GTGACCAAGTACTGCCTAATCTGCGTGAAGGACAGTTACACCGACTTCCACATCGACTCTGGGGGCGCCT
CTGCCTGGTACCAGTGTCTCAAGGGGAGAAGACCTTCTATCTCATCAGGCCGCGCTCGGCCAATCTC
CCTGTATGAGCGCTGGCGGTCTGCCTCTAACACAGCGAGATGTTCTTTGCTGACCAGGTGACAAATGC
TACAAGTGCATCGTCAAGCAGGGCCAGACCTCTTCATCCCTCAGGCTGGATCTACGCCACACTCACCC
CTGTGGACTGCCTGGCCTTCGCGGACATTTCTCCACAGCCTGAGTGTGGAGATGCAGATGAGAGCATA
CGAGGTGGAAGGAGGTTGAACTTGGCAGCCTGACTCAGTTTCCCAACTTTGAACTGCGTGTGTGAC
ATGGGAAGACCACTATTGGAGGCGTTCAAAGTTCTCAAGTCTGGGAAGCAGCTGCCCCACATCTAG
TCCAAGGAGCTAAAATTCTCAATGGTGCTTTCCGATCGTGGACGAAGAAGCAGGCTTTGGCAGAGCATGA
GGACGAGCTCCCGGAGCACTTCAAACCTTCAAGCTAATCAAGGACCTGGCCAAAGAGATCCGGCTCAGT
GAGAATGCTTCAAAGCCGTCCGACCGGAAGTGAATACTGTGCGCTCGTCAGATGAGGTGTGTGACGGGG
ACCGGGAGAAGGAGGAGCCCCCTCTCCATTGAGGCCACCCGCGCTCAATCCCTCCTGGAGAAAGTGTG
CAAAAAAAGACTCCCAAACTGTGAAGATGCCAAGCCATCCAAATCCCCAAGCCCCCGAAGCCCCCT
AAGCCCCAAGGCCCCCCCAAACGCTGAAGCTCAAAGATGGAGGCAAGAAGAAAGGAAGTCCCGGG
AGTCAGCCTCACCCACCATCCCCAAGCTGGACCTGCTCGAAGCCACACCAAGGAGGCACTGACCAAGAT
GGAGCCGCCCAAGAAGGGCAAGGCCACAAAGAGTGTCTGAGTGTGCCCAACAAAGATGTGGTTTACATG
CAGAATGATGTGGAGAGGCTGGAAATTCGAGAGCAACAAAGAGCAAGTCAGAAGCCAAGTGGAAATACA
AGAACAGCAAACTGACTCGTTACTGAAGATGGAGGAGGAGCAGAGGCTGGAGAAGTCCGCCCTCGTGG
GAACAAGGACAAGTTTTCTTTCTTTCTTCCAACAGAAAACCTCTGGGCTCCAAGGCCCTCAGGCCCCCG
AGCAGCCCTGGTGTGTTTGGCGCCTTGCAGAGCTTCAAGGAGGACAAGGCCAAGCCGTCGCGCATGAGT
ATGAGTACGTATCAGATGATGGGGAGCTGAAGATAGACGAGTTTCCCATCAGGAGGAAGAAGAGCGCCCC
CAAAGGGGACTTGTCTTCTTGTGTAGACAAGAAGGAGGCTCTCTCATGCCCACTCGAAGCCAAGCTG
GATTTCTGCGGTGTACAAGAGCGATGACTCTCTGACGAGGGCTCTCTGCACATCGACACGGACACCAAGC
CAGGCAGAAATGCCAAAGTGAAGAAGGAGAGTGGGAGCTCCGCGGCCGCGCATCCTGGACCTGCTGCAGGC
CAGCGAGGAGGTTGGCGCACTCGAGTACAACCCCAACAGCCAGCCCCCTGCCCTCCCCAGCACACAGGAA
GCCATTCAAGGAATGCTCTCCATGGCCAATCTGCAGGCCTCTGACTCTTGCTGCAGACCACATGGGGCA
CGGGGCGAGGCCAAGGGTGGCTCACTGGCAGCCCATGGTGGCCGGAAGATTGGTGGTGGCAACAAGGCAC
AGGCAAGCGCCTGCTGAAGAGGACTGCCAAGAACAGTGTGGATCTGGAGGACTACGAGGAGCAGGATCAC
CTGGATGCCTGCTTCAAGGACTCAGACTATGTTTACCCCTCACTGGAGTCTGACGAAGATAACCCGCTCT
TCAAGTCCCGGTCAAAGAAGAGGAAAGGCTCAGACGATGCTCCGTACAGCCCCACAGCCAGGGTCCGTCC
ATCGGTGCCAAGACAAGACAGGCCCTGTGCGTGAAGGGGACCAGAGTGGCCTCCATTGAGACGGGGCTGGCA
GCTGCTGCAGCCAAGCTGTCCAGCAGGAGGAGCAGAAAAACAGGAAGAAGAAGAACCAAAAGGAAGC
CGGCTCCTTAACACTGCTCCCTCCCTCCATCTCCACTCTGCTCCGCTCCACGGGTACCACTCGGCCTC
CACCACCCAGCATCCACCACCCCGGCTCCACCACCCAGCATCCACCACCCCGGCTCCACCAGCACA
GCCAGCAGCCAGGCCTCAGGAGGCGAGCTCAGTGAAGCCCCACCTGAATCACACAGCAGTAGCCTGG
CTGACCAGGAATATACAGCAGCCGCGACATTCTCGGGTCCAGGCTGGCCGTGCTTCCAGCCCATGGC
CCCTGGAGTCTTTCTCACACAGAGCGGCTTCTGCATCATCCCCAACAACTGCTGCCAAAGGAAAA
CGTACAAAAAAGGGCATGGCCACCGCAAGCAAGGAGTGGAAAGATCTTGAAGATCCATCGGAATGGGA
AACTGCTCCTCTAAGGCTTGGAAAGCCAGGATCCTTCTGATATGCTAAGGACCCCGGAGCCCCGCTACA
TCAGCCCTCCAGGACGGTGGCTGTGCCGCTGGCCCGGGAGGGCTTGCTTCAATCCGACCAATTTTC
CAATCAA

HPH1

SEQ ID NO:72

>gi|11038623|ref|NM_004426.1| Homo sapiens early development regulator 1
(polyhomeotic 1 homolog) (EDR1), mRNA

CCCGCCCTCGGCGCCCCCGCCCTCCAGAAAGGGGAGGAGGCGAGGGGAGCCCGCCGCGAGGCCGAGCG
AGCCCGCGCCCCAGCCAGCCTGGCGACTGGGGACCCCGGCACATGAGGTGGACGCCCGGGGAAGACTTG
GGTGACAGCCAGGCGAGAAGGTCTTGAGTCAGACAGAGCACCAGCCTTGGGGACCCTGGACCACTATCA
TGGAGACTGAGAGCGAGCAGAACTCCAATTCCACCAATGGGAGTTCTAGCTCAGGGGGCAGCTCTCGGCC
CCAGATAGCTCAAATGTCACTTTATGAACGACAAGCAGTGCAGGCTCTGCAAGCACTGCAGCGGCAGCCC
AATGCAGCTCAGTATTTCCACCAGTTCATGCTCCAGCAGCAGCTCAGTAATGCCAGCTGCATAGCCTGG
CTGCCGTCCAGCAGGCCACAATTGCTGCCAGTCGGCAGGCCAGCTCCCCAAACACCAGCACTACACAGCA
GCAGACTACCACCACCAGGCCCTCGATCAATCTGGCCACCACATCGGCCGCCAGCTCATCAGCCGATCC
CAGAGTGTGAGCTCTCCAGTGTCTACCACTTGACCCAATCTGTGCTACTGGGGAACACCACCTCCCCAC
CCCTCAACCAGTCTCAGGCCCAGATGTATCTACGGCCACAGCTGGGAAACCTATTGCAAGTAAACCGAAC
CCCTGGGTGCAATGTGCCTCTAGCCTCCCAACTCATCTGATGCCTAATGGGGCGGTGGCTGCAGTCCAG
CAGGAGGTGCCATCTGCTCAGTCTCCTGGAGTTTCATGCAGATGCAGATCAGGTTTCAAACTTGGCAGTAA
GGAATCAACAGGCCTCAGCTCAAGGACCTCAGATGCAAGGCTCCACTCAGAAGGCCATTCTCTCAGGAGC
CTCCCTGTCTCTAGCCTCTCCAGGCCCTTAGCCAGGCCCTAGCGGTGGCACAGGCTCTCTGGGGCC
ACAAACCAGTCCCTCAACCTTAGTCAAGCTGGTGGAGGCGAGTGGGAATAGCATCCAGGGTCCATGGGTG
CAGGTGGAGGTGGGCAGGCACATGGTGGTTTGGGTGAGTGCCTTCTCAGGAATGGGTGGTGGGAGCTG
TCCAGGAAGGGTACAGGAGTGGTGCAGCCCTTGCTGTCAGCCCAACAGTAACCTGTGAGCCAGGGCAGC
CAGACAGAGGCAGAAAGTGCAGCAGCCAAGAAGGCAGAGCAGATGGGAGTGGCCAGCAGAATGTGGGCA
TGAACCTGACACGGACAGCCACACCTGCGCCCGAGCCAGACACTTATTAGCTCAGCCACCTACACACAGAT
CCAGCCCCATTCACTGATTCAGCAACAGCAACAGATCCACCTCCAGCAGAAACAGGTGGTGTATCCAGCAG
CAGATTGCCATCCACCACCAGCAGCAGTTCAGCACCAGGCGAGTCCAGCTCCTTCACACAGCTACACACC
TCCAGTTGGCGCAGCAGCAGCAGCAACAACAGCAACAGCAGCAACAGCAGCAGCCGCAAGCCACCAC
CCTCACTGCCCTCAGCCACCACAGGTCCACCTACTCAGCAGGTCCACCTTCCAGTCCAGCAGCA
GCCCAAACCTGGTGGTTCAGCCCATGCTTCAGTCTTACCCTTGTCTCTTCCACCTGATGCAGCCCTTA
AGCCACCAATTCCCATCCAATCCAAACACCTGTAGCACTATCAAGCCGCTCAGTTAGGGGCGGCTAA
GATGTCACTGCGCCAGCAACCAACCCCATATCCCTGTGCAAGTTGTAGGCACTCGACAGCCAGGTACA
GCCCAGGCACAGGCTTGGGGTGGTGCACAGCTGGCAGCTGCTGTACCTACTTCCCGGGGGATGCCAGTA
CAGTGCAGTCTGGTCAAGGCCCTAAAGGCTTCTCGCCACCTTCATCCAGGCTCCTGGTGCATGCAGGA
GTCCCTCCACATTGGCCCCCGGGGATGACCTTGTCTCTGTGTCAGGGGACAGCACATGTGGTAAAGGGT
GGGGCTACCACTCCACACCTGTTGTAGCCAGGTCCCTGCTGCTTCTATATGCAGTCTGTGCACTTGC
CGGAAACCCAGAGCTGGTGTCAAACGCAAGGCTGACTCTGAGGAGGAGAGATGATGTCTCCAC
ATTGGGTTCAATGCTTCTCTGCAAGGCATCTCCAGTACAGCAGAAAGCCAAAGTCATGGACGAGAAGC
AGTCTTGGAGAAAAAGCTGAATCAGTGGCTAATGTGAATGCTAATACTCCAAGCAGTGAAGTAGTAGCCT
TGACCCCGCCCTTCACTACCGCCTCTACACTAGCCATGGTGTCTAGACAAATGGGTGACTCAAAACC
CCCACAGGCCATCGTGAAGCCCCAGATTCTCACCACATCATTTGAAGGCTTTGTATCCAGGAAGGAGCA
GAACCTTCCCGGTGTTGTTCTCAGTGTACTGAGGAGTCTGAGAAGCCACTACAGACTGGCCTTCCGA
CAGGCTTGACTGAGAATCAGTCAGGTGGCCCCCTTGGAGTGGACAGCCCATCTGCTGAGTTAGATAAGAA
GGCGAATCTCCTGAAGTGCAGTACTGTGGGAAGTACGCCCCGCGAGAGCAGTTTCTGGTCTTAAGAGG
TTCTGCTCCATGACCTGCGCTAAGAGGTACAATGTGAGCTGTAGCCATCAGTTCCGGCTGAAGAGGAAAA
AAATGAAAGAGTTTCAAGAAGCCAACTATGCTCGCGTTTCGAGGCGTGGACCCCGCCGAGCTCCTCTGA
CATGCCCCGTGCAAGATTGAGGCAAGTGCCACCGGGTCAAGAAGACTTAGCCGGGGTTAGATAAT
TCCAGTTATGATGAAGCACTCTCTCCAACATCTCTGGGCCCTTATCAGTAAGAGCTGGGCATGGAGAAC
GTGACCTGGGGAATCCCAATACAGCTCCACCTACACCGGAATTACATGGCATCAACCTGTGTCTCTGTC
CAGTAATCCAGCCGTTGGAGTGTAGAGGAGGTGTACAGTTTATTGCTTCTCTCAAGGCTGCCAAGAG
ATTGCAGAGGAATTCGCTCAGGAGATTGATGGACAGGCCTTTTTATTACTTAAAGAAGAACATCTTA
TGAGTCCCATGAACATCAAGCTGGGCCCTGCCCTCAAGATCTGTGCCAAGATCAATGTCCTCAAGGAGAC
CTAAGGTGGCCCTCTTGCAAAACAGCCTAAGGCAGACACTCTCCACTGTCCAGGTTATAACCTGGTAC
CAGCAGACTTTGCAGGGAAGAAAGAGTTGTTCCAATCATGTAACCTTCTGTAGGGGATTACTGAGACAGG
GAAGAGAAGTGAAGAAATTGGTTGCTGGTGTACATGGCGGCAGCTTTGACATTTTCTCTGGGTTCTACT
TTATTTTTTAAATCTTTACAGTCTCTCACCATTTCAGGTACCTTAATCCAATCTTTATAAAAGAGGCAGT
CTAGAGCCATGAGACTGCTCAGCCTTATCTGGAGTGTAGAGCATTAGCCAGGTCTTAATTTCTCAAGAG
GAGGAATACATAGTATGTAAGGCAAGGAACGGGTGGAATGTGAGTTGCTGCCCCAATGGGAGAGGTA
GGGTTTTTCTAGCTTGTGTGACAGAAGTAGCAAAATCTGGTCTCCCCCTCCAGTGTAGCTGTGGCTC
AGAGTTTTTTCTTTTGTGTCACTTACTCCCTTGTGATTGAATTTTTTCTCTGTCATCCATGGCAGGAT
CCCCAGCCAGTATAGAGACTTGGTTGGCATCTTCTGCTGCAGGGACTAAAGTATTTGACTGGGGCAGAT
GTGGCTGTTGTCTTCTGTCATCCCACTGTTCCCTCCAATTTATGTTATTTTCTACCCTGTTTTTC
AGTTCATCTCTGCTGTCTGCTATAGCTTTATAAAACAGAGTGTGTGGGGCTGAGGTGAGGAGTATAAG

TACCTGCCTTAGGCACTATTCTTATATAACAAAAATATTAAATATTTTTTCTCAGTAAAAGGATG

HPH2

SEQ ID NO:73

>gi|4758241|ref|NM_004427.1| Homo sapiens early development regulator 2 (polyhomeotic 2 homolog) (EDR2), mRNA

GGCGCCGATGTGCTCCGCGGCGGCTGCAGCCCTCGAGCGCCCGCCGCGCCCAACCCCGGCCCGCC
GCCGCCCCCTCCGCCCCGCTCGCGCCCCCGTCCCGGCCCTCGCGCCCGGCCCGCCCTTTGTTGACGCCG
GCCAGGCCGTGCGGTGCGATGCGCGCGGCGAGCCCCGGGCCCCGGCTCGGAGGCTCCCGGGGCGAGAGGA
GGCGGCCCGCCGCGCGGACCCCGCGGAGTCCGCCCCGGCCAGGGGCTGCGTAGGCCCGCCCGGCCAGG
CCCAGCCGCTGGACAGAGACAGGGCAGGGCATTTGTTTCATGCACTGACCGACCTCAGCATCCCGGCATG
ACCTCAGGGAACGGAACTCTGCCTCCAGCATCGCCGGCACTGCCCCCAAGAATGGTGAGAATAAACAC
CAGAGCCATTGTGAACCCCAATCTGACGCATGTTATCGAAGGGTTGTGATCCAGGAGGGGGCGGA
CGTTTTCCCGGTGGGACGCTCGTCTGCTGGTGGGGAATCTCAAGAAGAAGTATGCACAGGGGTTCTGCT
GAGAACTTCCACAGCAGGATCACACCACCACCTGACTCGGAGATGGAGGAGCCCTATCTGCAAGAAT
CCAAAGAGGAGGGTGCTCCCTCAAACCTCAAGTGTGAGCTCTGTGGCCGGGTGGACTTTGCCTATAAGTT
CAAGCGTTCCAAGCGCTTCTGTTCCATGGCTTGTGCAAGAGGTACAACGTGGGATGCACCAACGGGTG
GGACTTTTCCACTCAGACCGGAGCAAGCTGCAGAGGCGAGGCTGCGACCCACAACCGCCGTGGCGGAG
CAAAGCCAGTCTGCCACCTTACCAAGGATACCAAGAAGCAGCCACAGGCACTGTGCCCTTTCTGGTT
ACTGCTGCTTTGCGTAACACACAGCCAGGAAGACTCCAGCCGTTGCTCAGATAACTCAAGCTATGAGGAA
CCCTTGTCAACCATCTCAGCCAGCTCATCTACTTCCGCGGCGACAAGGCCAGCGGGACCTGGAGCTCCC
CGCATGTCATATGCGGGACCTGGTGGGCATGGGACACCACTTCTGCCAAGTGAGCCACCAAGTGAATGT
AGAAGACGCTTACGAATTCATCCGCTCTCTGCCAGGCTGCCAGGATAGCAGAGGAATCCGTGCCCAG
GAAATCGACGGGCAAGCCCTGCTGCTGCTCAAGGAGGACCACCTGATGAGCGTTATGAACATCAAGCTGG
GGCCCCGCTGAAGATCTACGCCCGCATCAGCATGCTCAAGGACTCCTAGGGCTGGTGGCACCAGGATTC
TGGCCAGGGCGCCTCCTCCGACTGAGCAGAGCCAGACAGACATTCCTGAGGGGCCAGAAATGGCGGC
GTTGGAGGGCAGGGCTCTCCCTAGGGGCATAGCTGGTGAGGAGGTCTGGGCACCTCCTCCATGGCTCTC
AGGGGCCCTTTCTTTCTGTTGGGAGGGGAGAGGTTAGGTGGCACAGAAGATGGGGCTTTATGCTTGTA
ATATTGATAGCACTGGCTTCTTCCAAAGTCCCAATACTCTAGCCCCGCTCTCTTCCCCTTTCTGTGCC
CCATTTTCCAGGGGTATATGGTCAGGGCTCCCAACCTGAGTTGGTTACTTCAAGGGCAGCCAGCAGGC
CTGGATGGAGGCTAGAAAGCCCTTGCTTCTTCTCCCACTTCTTTCTCCAGGCCTGGTTAACTCTTC
CGTTGTGAGCTTCTCCCCCTTACGCTGTTTCTGCAGCAGCCAGGGTCTCCCCCTACACCTCTGCGAG
GTGGAGAGAGAGAAGCTGGGCCAGCCGCGGTGCTGCTGGCCAAGACGCCTTAACGCTGTGTGTATGAC
TGTGTGACTGTGTGGGAGCCTGGACTGACAGATAGGCCAAGGGCTACTCTCTGGCATCTCAGGTGTTTT
GTAGCAAACAGCCACTTAGTGCTTTGTCTGGACTCCACTCAGCCTCAGGATGGGGAATAGCCAAGAATG
GCAGCCTCAGCGCAGAGGCAAGGTGAGAAAGAGACGGCGCTTCAGAGTTTCTTTCCAGACACCCCTCCC
CGCATGTGAAGTTCCCTGACCGCCCTCCTGGTTTCAAAAGAGCATTAAGAAAGCTGCGGTGGTCTGAG
CAACATGCCACAGACTGGAGCCTCCTGGCTGCTGCCCCCACCCTGGGAGTCCAGTGGTGGGCTC
AGAGAATTTCTAAGGGGAAAGAACAGCTGGAGTTTCTGTTGATGTGAAGAAGGCAGCTCTGGCCTCCCA
CTCCACACTTCTTGCCTATAAATCTTCTAGCAGCAATTTGAGCTACCTGAGGAGGAGGCAGGGCAGA
AGGGCAAGGGCTGCTCTGACCTGCCGTGCTCTTTCAGGAAGGAGGTAGGCACCTTTCTGAGCTTATT
CTATTCACCCACCCACACCCCGAGGAGGGTTGGAATGAAGGACTTTTTTAACCTTTGTTTTTTTAA
AAAATAAATCTGTAAAATCTGAAAAA

SSX1

SEQ ID NO:74

>gi|5032120|ref|NM_005635.1| Homo sapiens synovial sarcoma, X breakpoint 1 (SSX1), mRNA

CACTTTGTACCAACTGCTGCCAATCGCCACCCTGCTGCCGCAATCGCAACCCTGCTTTGTCTCTGA
AGTGAGACTGCTCTGGTGCCATGAACGGAGACGACACCTTTGCAAAGAGACCCAGGGATGATGCTAAAG
CATCAGAGAAGAGAAGCAAGGCCTTTGATGATATTGCCACATACTTCTCTAAGAAAGAGTGGAAGAGAT
GAAATACTCGGAGAAAATCAGCTATGTGTATATGAAGAGAACTATAAGGCCATGACTAACTAGGTTTC
AAAGTACCCCTCCACCTTTTCTGTGTAATAAACAGGCCACAGACTTCCAGGGGAATGATTTTGATAATG
ACCATAACCGCAGGATTGAGTTGAACATCCTCAGATGACTTTCGGCAGGCTCCACAGAATCATCCCGAA
GATCATGCCCAAGAAGCCAGCAGAGGACGAAAATGATTGGAAGGGAGTGTGAGAAGCATCTGGCCACAA
AACGATGGGAAACAACTGCACCCCCAGGAAAAGCAATATTTCTGAGAAGATTAATAAGAGATCTGGAC
CCAAAGGGGGAAACATGCCTGGACCCACAGACTGCGTGAGAGAAAGCAGCTGGTGTATTAAGAGAT
CAGTGACCTTGAGGAAGATGACGAGTAACCTCCCTGGGGGATACGACATGCCCTTGATGAGAAGCAGA
ACGTGGTGACCTTTACGAACATGGGCATGGCTGCGGCTCCCTCGTCATCAGGTGCATAGCAAGTG

SSX2

SEQ ID NO:75

>gi|10337582|ref|NM_003147.1| Homo sapiens synovial sarcoma, X breakpoint 2 (SSX2), mRNA

CTCTCTTTTCGATTCTTCATACTCAGAGTACGCACGGTCTGATTTTCTCTTTGGATTCTTCCAAAATCAG
AGTCAGACTGCTCCCGGTGCCATGAACGGAGACGACGCCTTTGCAAGGAGACCCACGGTTGGTGCTCAAA
TACCAGAGAAGATCCAAAAGGCCCTTCGATGATATTGCCAAATACTTCTCTAAGGAAGAGTGGGAAAAGAT
GAAAGCCTCGGAGAAAATCTTCTATGTGTATATGAAGAGAAAGTATGAGGCTATGACTAAACTAGGTTTC
AAGGCCACCTCCACCTTTTCATGTGTAATAAACGGGCCGAAGACTTCCAGGGGAATGATTTGGATAATG
ACCCTAACCGTGGGAATCAGGTTGAACGTCTCAGATGACTTTCGGCAGGCTCCAGGGAATCTCCCCGAA
GATCATGCCCAAGAAGCCAGCAGAGGAAGGAATGATTCGGAGGAAGTGCCAGAAGCATCTGGCCCCACAA
AATGATGGGAAAGAGCTGTGCCCCCGGGAAAACCACTACCTCTGAGAAGATTACAGAGAGATCTGGAC
CCAAAAGGGGGGAACATGCCTGGACCCACAGACTGCGTGAGAGAAAACAGCTGGTGATTTATGAAGAGAT
CAGCGACCTGAGGAAGATGACGAGTAACCTCCCTCAGGGATACGACACATGCCCATGATGAGAAGCAGA
ACGTGGTGACCTTTCACGAACATGGGCATGGCTGCGGACCCCTCGTCATCAGGTGCATAGCAAGTG

Table 3 Enhancers of trithorax and polycomb.

EPC1

SEQ ID NO:76

>gi|13376809|ref|NM_025209.1| Homo sapiens enhancer of polycomb 1 (EPC1), mRNA

ATGAGTAAACTGTCGTTTCGGGCGCGGGCGCTAGACGCCTCGAAGCCGCTGCCGGTTTTCCGCTGTGAGG
ATCTGCCCGACCTGECAGAAATACGCCTCGATAAACAGGGCCGTGCCCGAGATGCCACCGGAATGGAGAA
GGAAGAGGAGTCGGAACATCATCTTCAGCGGGCTATTTTCAGCACAGCAGGTGTATGGCGAGAAGAGGGAT
AATATGGTTATACCGGTCCCGAGAGGCAGAAAGTAATATTGCTTACTATGAGTCTATATATCTTGGGGAAT
TTAAGATGCCAAAGCAGCTCATTACATACAGCCTTTAGTTTGGATGCTGAACAGCCTGATTATGATT
GGATTCTGAAGATGAAGTATTTGTGAATAAACTGAAAAGAAAATGGACATCTGCCCATTTGCAATTTGAG
GAGATGATTGACCGCTAGAAAAAGGCAGTGGTCAGCAGCCAGTCAGTCTGCAGGAAGCCAACTACTGC
TAAAAAGAGATGATGAACATAATTAGAGAAGTTTATGAATATTGGATTAAAAAGAGAAAAAACTGTGAGG
GCCATCTCTTATTCCATCAGTAAAAACAAGAGAAGCGAGATGGTTCCAGCACAAATGATCCTTATGTGGCT
TTTAGAAGGCGTACTGAAAAAATGCAGACTCGAAAAAATCGAAAAATGATGAAGCCTCTTACGAAAAA
TGCTTAAGCTGCGACGAGATCTAAGTCGAGCTGTACTATTCTAGAGATGATAAAAAGAAGAGAAAAAG
TAAAGAGAGCTATTGCACTTAACACTGGAAATATGGAAGAGAGGTATAATTTGGGCGACTACAATGGA
GAGATCATGTCTGAGGTATGGCACAGAGACAGCCAATGAAACCTACTTATGCCATCCCCATCATCCCTA
TTACTAATAGCAGTCAATTTAAACACCAGGAAGCAATGGATGTGAAGGAGTTCAAAGTTAATAAGCAAGA
TAAAGCGGATCTTATCCGACCGAAACGGAATATGAAAAGAAGCCAAAGTCTTACCATCGTCTGCCGCT
GCTACTCCCCAACAGACGAGTCTGCTGCACTGCCAGTCTTCAATGCTAAAGATCTGAATCAGTATGACT
TTCCAGCTCAGACGAAGAACCTCTCTCCAGGTTTTGTCTGGCTCTTCGGAAGCTGAGGAAGACAATGA
TCCTGATGGTCTTTTGTCTTCCGTAGGAAAGCAGGCTGTCACTATGCTCCTCACTTAGACCAAAT
GGCAACTGGCCTTGGACTAGTCTTAAGATGGAGGATTAGGGGATGTGCGATATAGATACTGCTTAECTA
CTCTCACCCTACCCCAAAGGTGTATTGGATTTCACGAAGACGGGTGGGCGCGGTGGAAGGGTCTTACT
GGACAGAGCTCATTGACACTATGACAGTGTGTTTACCATCTGGATTGGAAATGCTTTCCCTACCAACA
CATTCTCCAGTCAATCAGTTTGCCAATACCTCAGAAACAAATACCTCGGACAAATCTTTCTCTAAAGACC
TCAGTCAGATACTAGTCAATATCAATCATGTAGATGGCGGCATTTTAGGCCTCGGACACCATCCCTACA
TGACAGTGACAATGATGAACCTCTCTGTAGAAAAATTATATAGGAGTATAAACCGAACAGGAACAGACAA
CCTGGGACCCAGACATGCAGTACCTCTACGCAAAAGTAAAAGTAGCAGTGGTTCAGCACACTTTGCATTTA
CAGCCGAACAATACCAGCAACATCAACAGCAACTGGCACTCATGCAGAAACAGCAGCTTGCACAAATTCA
GCAACAGCAAGCAAAATAGTAATTCCTCCCAACACATCACAGAACCTTGCACTAACCCAGCAGAAAAGT
GGCTTTTCGCTGAATATACAGGGTTTAGAAAGAACACTACAGGGTTTGTCTTCTAAGACTTTGGATTCTG
CTAGTGACACATTTGCTGCTTTTGGTGACATCAGAACTGATGGGATTCAAGATGAAGGATGA
TGTGGTGCTTGAATCGGGGTGAATGGCGTCTTCCAGCCTCAGGAGTATACAAGGGCTTACACCTCAGT
AGTACTACACCAACAGCACTTGTACATACAAGTCCATCAACGGCAGGTTTCACTTTGTACAGCCTTCAA
ATATTACACAGACTTCAAGTTCCCACAGTGCAGTCACTCAAGTAAGTCTGCAAAATCTGCAACAAC
TCAGGTTCTGATTGGGAACAACATTCGATTAAGTGACCTTCATCAGTTGGCACTGTAACTCTATTGGC
CCAATAAATGCACGACATATACCTAGGACTTTAAGTGCTGTCCATCATCTGCCCTTAAAGCTGGCCGCTG
CAGCAAACTGTCAAGTTTCCAAGGTCCCATCTTCATCCTCTGTAGATTCAAGTTCCAAGGGAAAATCATGA
ATCAGAAAAGCCAGCACTGAACAACATAGCAGACAACACAGTAGCGATGGAGGTGACGTAG

EZH1

SEQ ID NO:77

>gi|4503622|ref|NM_001991.1| Homo sapiens enhancer of zeste homolog 1 (Drosophila) (EZH1), mRNA

GAGGCTGGACACCTGTTCTGCTGTTGTGTCCTGCCATTCTCCTGAAGAACAGAGGCACACTGTAAACCC
AACACTTCCCCTTGCATTCTATAAGATTACAGCAAGATGGAAATACCAATCCCCCTACCTCCAATGTA
TCACTTACTGGAAAAGAAAGTGAATCTGAATACATGCGACTTCGACAACCTAAACGGCTTCAGGCAAA
TATGGGTGCAAAGGCTTTGTATGTGCAAATTTTGCAAAGGTTCAAGAAAAAACCCAGATCCTCAATGAA
GAATGGAAGAAGCTTCGTGTCCAACCTGTTCACTCAATGAAGCCTGTGAGTGGACACCCCTTTTCTCAAAA
AGTGTACCATAGAGAGCATTTTCCCGGGATTGCAAGCCAACATATGTTAATGAGGTCACTGAACACAGT
TGCATTGGTTCCCATCATGTATTCTGGTCCCCTCTCCAACAGAACTTTATGGTAGAAGATGAGACGGTT
TTGTGCAATATTCCTACATGGGAGATGAAGTGAAGAAGAAGATGAGACTTTTATTGAGGAGCTGATCA
ATAACTATGATGGGAAAGTCCATGGTGAAGAAGAGATGATCCCTGGATCCGTTCTGATTAGTGATGCTGT
TTTTCTGGAGTTGGTCGATGCCCTGAATCAGTACTCAGATGAGGAGGAGGAAGGGCACAATGACACCTCA
GATGGAAAGCAGGATGACAGCAAAGAAGATCTGCCAGTAACAAGAAAGAGAAAGCGACATGCTATTGAAG
GCAACAAAAGAGTTCCAAGAAACAGTTCCCAAATGACATGATCTTCAGTGCAATGCGCTCAATGTTCCC
TGAGAATGGTGTCCCAGATGACATGAAGGAGAGGTATCGAGAATAACAGAGATGTGAGACCCCAATGCA
CTTCCCCCTCAGTGACACCCCAACATCGATGGCCCCCAATGCCAAGTCTGTGACGGGAGCAATCTCTGC
ACTCCTTCCACACACTTTTTTGGCCGGCGCTGCTTTAAATACGACTGCTTCTCCTCACCCCTTTTCATGCCAC
CCCTAATGTATATAAACGCAAGAAATAAGAAATCAAGATTGAACCAGAACCATGTGGCACAGACTGCTTC
CTTTTGCTGGAAGGAGCAAAGGAGTATGCCATGCTCCACAACCCCGCTCCAAGTGTCTGGTTCGTGCGC
GGAGAAGGCACCATAGTCAGTGCTTCTGCTCCAATGCCTCAGCCTCTGCTGTGGCTGAGACTAAAGA
AGGAGACAGTGACAGGGACACAGGCAATGACTGGGCCCTCCAGTTCTTCAGAGGCTAACTCTCGCTGTCAG
ACTCCCAAAAACAGAAGGCTAGTCCAGCCCCACCTCAACTCTGCGTAGTGGGAAGCACCCCTCGGAGCCTG
TGGAATGGACTGGGGCTGAAGAAATCTCTTTTTCGAGTCTTCATGGCACCTACTTCAACAACCTTCTGTTT
AATAGCCAGGCTTCTGGGGACCAAGACGTGCAAGCAGGTCTTTEAGTTTGCAGTCAAAGAATCACTTATC
CTGAAGCTGCCAACAGATGAGCTCATGTACCCCTCACAGAAGAAGAAAGCAAGCAAGATTGTGGGCTG
CACACTGCAGGAAGATTCAAGCTGAAGAAAGATAACTCTTCCACACAAGTGTACAACCTACCAACCCCTGCCA
CCACCCAGACCGCCCTGTGACAGCACCTGCCCTGCATCATGACTCAGAATTTCTGTGAGAAGTTCTGCG
CAGTGCAACCCAGACTGTGAGAAATCGTTTCCCTGGCTGTGCTGTGTAAGACCCAGTGCAATACCAAGCAAT
GTCCTTGCTATCTGGCAGTGCGAGAATGTGACCTGACCTGTGTCTCACCTGTGGGGCCTCAGAGCACTG
GGACTGCAAGGTGGTTTCTGTAAAACTGCAGCATCCAGCGTGGACTTAAGAAGCACCTGCTGCTGGCC
CCCTCTGATGTGGCCGGATGGGGCACCTTCATAAAGGAGTCTGTGCAGAAGAACGAATTCATTCTGAAT
ACTGTGGTGAAGCTCATCTCTCAGGATGAGGCTGATCGACGCGGAAAGGTCTATGACAAATACATGTCCAG
CTTCTCTTCAACCTCAATAATGATTTTGTAGTGGATGCTACTCGGAAAGGAAACAAAATTCTGATTGCA
AATCATTCAAGTGAATCCCACTGTTATGCCAAAGTGGTCAATGGTGAATGGAGACCATCGGATTGGGATCT
TTGCCAAGAGGGCAATTCAGCTGGCGAAGAGCTCTTCTTTGATTACAGGTACAGCCAAGCTGATGCTCT
CAAGTACGTGGGGATCGAGAGGGAGACCGACGCTCTTTAGCCCTCCAGGCCCAACGGCAGCACTTATG
GTAGCGGCACTGTCTTGGCTTTCTGTGCTCACACCACTGCTGCTCGAGTCTCCTGCACTGTGTCTCCACA
CTGAGAAACCCCCCAACCCACTCCCCCTGTAGTGAGGCCCTGTCATGTCCAGAGGGGCACAAAACCTGTCT
CAATGAGAGGGGAGACAGAGGCAGCTAGGGCTTGGTCTCCAGGACAGAGAGTTACAGAAATGGGAGACT
GTTT

EZH2

SEQ ID NO:78

gi|4758323|ref|NM_004456.1| Homo sapiens enhancer of zeste homolog 2 (Drosophila) (EZH2), mRNA

GAATTCCGGGCGACGCGGGGAACAACGCGAGTCCGCGCGGGGACGAAGAATAATCATGGGCCAGACTG
GGAAAGAAATCTGAGAAGGGACAGTTTGTGGCGGAAGCGGTGTAATAATCAGAGTACATGCGACTGAGACA
GCTCAAGAGGTTCAAGCAGAGCTGATGAAGTAAAGAGTATGTTTAGTTCCAATCGTCAGAAAATTTTGGAA
AGAACGGAAATCTTAAACCAAGAATGGAAACAGCGAAGGATACAGCCTGTGCATCCTGACTTCTGTGA
GCTCATTGCGCGGGAAGTAGGGAGTGTTCCGGTACCAGTGACTTGGATTTTCCAACACAAGTCATCCCAT
AAGACTCTGAATGCAGTTGCTTCAGTACCCATAATGTATTCTTGGTCTCCCTACAGCAGAATTTATG
GTGGAAGATGAAACTGTTTACATAACATTCCTTATATGGGAGATGAAGTTTATAGATCAGGATGGTACTT
TCATTGAAGAATAATAAAAAATTATGATGGGAAAGTACACGGGGATAGAGAATGTGGGTTTATAAATGA
TGAAATTTTGTGGAGTTGGTGAATGCCCTTGGTCAATATAATGATGATGACGATGATGATGATGGAGAC
GATCCTGAAGAAAGAGAAGAAAAGCAGAAAGATCTGGAGGATCACCGAGATGATAAAGAAAGCCGCCAC

BMI1

SEQ ID NO:79

GAGAGGCAGAGATCGGGGCGAGACAATGGGGATGTGGGCGCGGGAGCCCCGTTCCGGCTTAGCAGCACCT
CCACGCCCCGCAAGATAAAACCGATCGCGCCCCCTCCGCGCGCGCCCTCCCCGAGTGC GGAGCGGGAGG
AGGCGGCGGGCGGGCGAGGAGGAGGAGGAGGCGCCCGGAGGAGGAGGCGTGTGGAGGTGCAGGCGGGAGGC
GGAGGGAGGAGGAGGCGGAGCGCGCGGAGGAGGCGCGGAGCAGGAGGAGGCGGGCGGGAGCGCG
CATGAGACGAGCGTGGCGGCGCGGCTGCTCGGGGCGCGCTGGTTGCCATTGACAGCGGCGTCTGCAG
CTCGCTTCAAGATGGCCGCTTGGCTCGCATTCAATTTCTGCTGAACGACTTTTAACTTTCATTGTCTTTT
CCGCGCGCTTCGATCGCCTCGCGCGGGCTGCTCTTTCCGGGATTTTTTATCAAGCAGAAATGCATCGAAC
AACGAGAATCAAGATCACTGAGCTAAATCCCCACCTGATGTGTGTGCTTTTGTGGAGGGTACTTTCATTGAT
GCCACAACCATAATAGAAATGTCTACATTTCTTGTAAAACTTGTATTGTTCTGTTTACTCTGGAGACGAGCA
AGTATTGTCTTATTTGTGATGTCCAAGTTCACAAGACCAGACCCTACTGAAATATAAGGTGAGATAAAAC
TCTCAAGATATTGTATACAAATTAGTTCCAGGCTTTTCAAAAATGAAATGAAGAGAAGAAGGGATTTT
TATGCAGCTCATCTTCTGCTGATGTCTGCCAATGGCTCTAATGAAGATAGAGGAGAGGTTGCAGATGAAG
ATAAGAGAATTATAACTGATGATGAGATAAATAGCTTATCCATTGAAATTTTGGACGAGAACAGATTGGA
TCGGAAAGTAAACAAAGACAAAGAGAAATCTAAGGAGGAGGTGAATGATAAAAGATACTTACGATGCCCA
GCAGCAATGACTGTGATGCACTTAAGAAAGTTTTCTCAGAAAGTAAATGGACATACCTAATACTTTCCAGA
TTGATGTGATGATGATGAGGAGGAACCTTTTAAAGGATTATTATACACTAATGGATATTGCCTACATTTATAC
CTGGAGAAGGAATGGTCCACTTCCATTGAAATACAGAGTTCGACCTACTTGTGAAAGAATGAAGATCAGT
CACCAGAGAGATGGACTGACAAATGCTGGAGACTGGAAAGTGACTCTGGGAGTGCAAGGCCAACAGGCC
CAGCAGGAGGAGTTCCCTCCACCTCTTCTGTTTTGCCTAGCCCCAGTACTCCAGTGCAGTCTCCTCATCC
ACAGTTTCTCTACATTTCCAGTACTATGAATGGAACGAGCAACAGCCCCAGCGGTAAACCACCAATCTTCT
TTTGCCAATAGACCTCGAAAATCATCAGTAAATGGGTATCAGCAACTTCTTCTGGTTGATACCTGAGAC
TGTTAAGGAAAATAATTTAAACCCCTGATTTATATAGATATCTTCAGCCATTACGACTTTCTAGAGCTA
ATACATGTGACTATCGTCCAATTTGCTTTCTTTTGTAGTGACATTAAATTTGGCTATAAAAGATGGACTA
CATGTGATACTCCTGTCCGCTTGGTTCAAAGAAAGATTGTTGTTATAAAGAATTGGTTTCTTGGAAAG
CAGGCAAGACTTTTTCTCTGTGTTAGGAAAGATGGGAAATGGTTTCTGTAAACCATTGTTTGGATTGGAA
GTACTCTGCAGTGGACATAAGCAATTTGGGCCATAGTTTGTAAATCTCAACTAACGCCCTACATTACATTTCT
CTGATCGTTCTTGTATTATAGCTGTTTTTGTGAACCTGTAGAAAACAAGTGCTTTTTTACTTTGAAATTC
AACCAACGGAAAGATATGCATAGAAATAATGCATTCTATGATGCCATGTCACTGTGAATAACGATTTCCT
GCAGCTATTTAGCCATTTTGATTGCTGTTTGATTATACCTTCTGTTGCTACGCAAAACCGATCAAAGA
AAAGTGAACTTCAGTTTTACAATCTGTATGCCATAAAGCGGGTACTACCGTTTATTTTACTGACTTGT
AAATGATTCGCTTTTTGTAAAGATCAGATGGCATTATGCTTGTGTACAATGCCATTTTGTATATGACAT
AACAGGAAAACAGTATTGTATGATATATCTATAAATGCTATAAAGAAATATTGTGTTTCATGCAATTCAGAA

96

GGCCGGCGTGACAGGCTCTGTCACTAAAATAGGAACCGAATATTGTATCTGACGCATCCTGTAATACTGA
 AGAGCAACTGAAGACAGTTGATGATGTCCTTATTTCATTGCCAGGTTATATATGATGCTCTGCAAAACCTG
 GATAAGAAGATTGATGTGATTTCGTAGAAAGGTTTCAAAAATCCAACGTTTCCATGCGAGATCCCTGTGGA
 CAAATCATTAAGCGATATGGATATAAAAAGCATTCTTACCGGCTTGTTAAAAAGCTTAACTCCAGAAAAT
 GAAGAAAAATGAGGTTTACGAGACATTCTCCTACCCTGAAAGTTACAGCCCCACTTTACCAGTGTCAAGG
 CGTGAGAAATAATTCCCGGAGCAACCTTCCAAGGCCATCCTTTGTCATGGAAGAATACCAGCGAGCTGAGC
 TGGAGGAGGACCCGATCCTCAGCCGCACTCCGAGTCCAGTGCATCCCTCAGATTTCTCTGAGCATAATTG
 TCAGCCGTATTATGTCATCTGATGGTGCACCGTATGGTTCCTTCTCAGGGCTCTGCCCTTGGCAACCCCTCGG
 GCTGACAGCATCCACAACACTTACTCACTGACCATGCTTCTGAGGCCAACATGCTTCTGAGCACCACCTTCAGTTACAAGGTCAC
 CAGTTGAAAATGACGGTTACATAGAGGAAGGAAGCATCACTAAGCACCCTTCAACCTGGTCGGTGGGAAGC
 AGTGGTCTCTATTTCTAAACAAACAGATCCTCTTGCATTATGCCCTCTTGTGACCTCTTCAGAAGCCAT
 GAAATTGACGGGAAGGCTCTGCTCCTACTCAGGAGTGACGTGTTGCTGAAGCATTGGGGGTGAAGCTGG
 GAACGGCTGTGAAGCTATGCTACTACATTGACCGACTTAAACAAGGAAAATGCTTTGAAAATTGAAAAAA
 TCCTTGTGCAAAATTTAGATTGGGCCAATCTCTAGAGGCCAATGCTTCTTAGTGTGGAATCATTTTTC
 TGCCCTTTAGTCGTTTTTGTGTTTGTAGAAAATATCTCTCAAAATATATTATAGCTAGAATTGTAGAACTA
 TGTTATAGTCCAGTCTACTTCTTAAAAACCATTTAACTGCTAGATAGTATTAGAATAGTCCAATAGAA
 AATTCTCTTTATAGGTCCTTAAAAATTAATTTTATTATATGTTTACAATATATTTTCATGCAAGAAA
 CAGAAAAAACCCTTTGATTCTGGTTCATCTCGATACAGAGAACCAAAACAGCTAAGAGAGGTA
 TTATCAGGGTTGACAACCTCTATGATTGAATCTATGGGAATTATTCTCAGAAGAGAATTAAAGGTGTA
 CCCATATATATCTCTTCTGGAGTATTTATCTGTCTGATGTTGCAGTATTCTACAAGTTTCCAGAAAGA
 GAATAGCCATATAAATTATTTCTCTGCTATTATTTCTCTATATGTTTTATTTATTCAGATTTAGAG
 TAAAAATAAGCATATAAATCTTTATTTATGTGCTCTTAAACAGTTTTAAGATAAACTATAGGATAGATAGA
 ATGGTTATTTATGCAAGAAATATTGTACCGCAAGGGTGGTTGGATGAAGCTGACTACTTTTTTTTCAA
 ACAACTATTATTAATACTGTCAATTTTGGCTAAGTTGGACCTATAACTACACTTTCATGTTTGC
 ATCTCTCTATGAAGATACGTCTGTCCAACTTTTAAAGGCATAACTGTATTTTATGTGTTTATTCTTTA
 TATAGATAGTATTTTATATTTTATCTCACCCGAAGTATTCACACAATCTTTTTAAAAAAATTTGAAAT
 GGCATTTTGTATTGCCACAGAGGTAGGATGAGCCATATATAGTGAAATGTTTTATTTGTAAAATATAA
 ATGGATTATTTGCCATCATTAGTACCTCTCACTTACTTTTAGAGGACAAGAAACAATCTGTAGATTGG
 TTTCCATACAGGGAAGTCTCCGTCTATGCAATGTTTCTAATTAATTGCTTAATCTGAGCCATTAAT
 CCTGCTACACTTTGAATGATACATTAATTCAGACTAATCTTTGGGGGCTTTATTTTGAAGTTAGAATT
 TCAAGGGAACATGTTCAACACTATATTTTGTATATAAATTATAACTTTGTTATTACATTGTGTAACAA
 ATATAAGGTTTACGAGCTATGAGAATTGGTGCTATCACCATTAGCTATTTGCTGTAATGTCAAGAAAATG
 TTCACAGATGAAGAATGTACCTTTCTTTTAGAAAGCCAAATGTACTTTAGACATGAATCAACTAT
 TTAAGAATAGCTTCATCAATGTTATTCCTTACATGTTTACATAGATTCTTACTTAACTTGGTCTCTTTC
 AAATTGTTTGTATGAAGATGCTGTACCCACTTGAACAGTCTCAGGTGTTTACATAAAATACTATGTTTTA
 CAGTTTTCATATTTTAAATATTAATAAAGTTAAATCACAATAGT

SCML2

SEQ ID NO:82

>gi|5174668|ref|NM_006089.1| Homo sapiens sex comb on midleg-like 2
 (Drosophila) (SCML2), mRNA

GAAGCTCGGTGCGCGCTCGCGCGATCGGTGGGACAGAATTCGTTGTTTTACCAGACGAGACTGGAGGAA
 ACAACACCAATAGGGATACCATGGGACAAACAGTGAATGAAGATTCCATGGATGTCAAGAAGGAGAATC
 AAGAGAAAACCTCTCAGTCAAGTACATCTTCTGTACAAGGGATGATTCCACTGGGAGGAGTATTTGAA
 AGAGACTGGGTCTATAAGTGCTCCTTCAGAGTGCCTCCGTCAGTCTCAGATTCCACCTGTGAATGATTTT
 AAAGTTGGTATGAAATTGGAAGCCCGTGACCCTCGCAATGCCACTTCAGTATGTATTGCTACGGTTATTG
 GAATTACTGGGGCCAGGTTACGGTTACGACTGGATGGTAGTGACAACAGAAATGATTTTGGAGGCTTGT
 CGATTCGCCAGACATACAACCTGTGGGACATGTGAAAGGAAGGAGACTTACTTCAACCTCCACTAGGG
 TACCAGATGAATACATCCTCTGGCCGATGTTCTTTAAAGACACTAAATGGGTCTGAAATGGCATCTG
 CCACATTATTTAAGAAGGAACCAACAAAGCCCCCACTTAAATAATTTTAAAGTGGGGATGAACTGGAAGC
 TATTGACAAAAGAACCCGTATCTCATCTGTCTGCGACCATTGGAGATGTTAAAGGGATGAAGTTTCAT
 ATCACATTTGATGGCTGGAGTGGAGCTTTTGATTACTGGTGCAAGTATGATTCTCGAGATATTTTCCAG
 CTGGGTGGTGTGCGCTGACAGGAGATGTATTACAACCCCAAGGAACCTAGTGTTCCTATTGTAAAGAATAT
 AGCAAAAACAGAGTCTTCTCCTCCGAAGCAGCAGCATTCAATGCAGTCTCCACAGAAAACCTACTTA
 ATATTACCAACACAGCAGGTGAGGAGATCAAGTCGAATTAAACCACCTGGACCTACTGCAGTCCCCAAA
 GGAGCAGTTCTGTTAAAAATATCACACCAAGGAAAAAAGGTCCAACTCAGGAAAAAAGGAAAAACCTTT
 GCCCGTGATATGTTCTACATCTGCAGCTTCTTAAATCGCTGACCAGAGACCGTGGCATGTTATATAAA
 GATGTCGCTTCTGGGCCATGTAATAAGTGTATGCTACAGTCTGTGCTATGTAAACAAACATGGAACT
 TTGGCCCTCATCTGGATCCCAAGAGAATCCAGCAGCTGCCTGACCCTTCGGCCCCGGGCGGTGAATGT
 GGTGCTTCGCCGGATTGTGCAGGCCTGTGTGGATTGTGCCCTTGAAACTTAAACTGTTTTTGGATACCTG
 AAGCCAGATAATCGTGGAGGAGAAGTGATAACTGCCTCCTTTGATGGGGAACTCATTCCATCCAGCTCC
 CTCAGTGAACAGTGCATCATTTGCTCTTCGCTTTCTTGAGAATCTTCCACAGTCTGCAGTGTGATAA

CCTTTTGAGTAGCCAGCCTTTTAGTTCTTCCAGGGGTCTACTCTCAGAGCTCTGCAGAGCATGATAAAAT
 CAGTCAGCAAAAGAAGATGTAACAGAAAGGCAAGCAACCAACGATCTCCTCAGCAAACTGTACCATATG
 TTGTTCTCTCTCTCCTAAGCTCCCCAAAACAAAGGAGTATGCGTCTGAAGGAGAACCATTGTTTGCTGG
 GGGAAAGTGCCATTCCCAAAGAGGAGAATCTTTCAGAAAGATTCTAAGAGCTCATCTAAATTCAGGAAAT
 TATTTGAATCCTGCCTGTAGAAATCCTATGTATATTCATACTTCAGTCTCCAGGATTTTTCTCGAAGTG
 TGCCAGGCACCACAAGTTCACCACTAGTTGGGGACATATCCCCAAGAGCAGTCCCCATGAAGTTAAATT
 CCAATGTCAGAGGAAAAGTGAAGCTCCAAGTTATAGCTGTACCTGATCCAGTGTCTGAAACAAGGC
 TTCTCTAAGGACCCTTCAACCTGGTCTGTGGATGAAGTGATACAGTTTATGAAAACATACAGATCCTCAGA
 TATCAGGCCCCCTCGCCGACCTCTTCAGGCAACATGAAATTGATGGGAAGGCTCTGTTCTACTCAAGAG
 TGATGTGATGATGAAGTATATGGGGCTGAAGCTGGGGCCAGCATTAAAGCTGTGTTACTACATTGAAAAG
 CTTAAAGAAGGAAAATACAGTTAAAAAATGTGTAGTTTAGATTGGACATAATTCTCAGGTGTACTGTTA
 ACATTTTAATTTAAAGTATTTCTCTTAGCAGTTTGTGTTTTGTAGACAGTTCCCATAAAAATATTTTAT
 CAGAATTGCAGAACTGTAGTAACAGTTTCACTCACTTTGTTTTTTTCTGGAGTCACCAACCAGCTTTGG
 GAGACACAGCCGCACTCCCCAGTCTACTTCTTTAAAAAGCATTTAACAGGTTAGTATTGGCATATTCA
 AATTGGCAGTTCTTTATGCTTTTTAAATTTTCAATGTACAGTTTACAATACTTAATGTAGTTAACA
 GAGAAAAACCTTTGATTTTGGTTAACCTTTATATCTAGAACCAAAACAGCTAAATCCCAAAGGGGAAAAT
 ATCAGGGATTGACAACCTTCTATAATTAAATCCATGAGAATTTTCTCACTAGAGAATTTAAAGTGTGCAC
 CTGTAGATATCATCTTTTCTCAGATATTTTGTGTGATACTCTGTGGTGTCTGTTTCATGTTCTATCAGTA
 TATCTAGAAAGGGAATAGCCATATAAATTATTTTCTTTTATTATTTCTCTGTATGTTGTATTGATCAT
 ATTTAAAGGAAAAAGCAAGCTTATAAGCTTTCATGAAGTGTCTTACCAGTTTTTGATAAAATTTTTTAA
 ATTATAGGATAGAATTGTCATTTTATGCAGGAGATATTTATACTACGAGGGTGTGTTGGATGGAGTCAGA
 TTAATTTTTTTCAGTGAAATTCCTATTATTTTAAACTTTCCATATTTTCACTACGCTTGGACATTTAAC
 TAGGCATTCTTTTCTTACATCTCTATATGAAGATACCTGTGTCCAAAATTTTGAAGATATATATTGTAT
 GTGTTTATTCTTCATATGGTACTTTACCATATTTATATATTGTTTTTATACCTGTAGGTTTACACACAAGT
 AAATCTTTTTTTCTTGAATTTAATCTGGGCACCTTGCACCTGCCACAGGGGTGACGATGGAACCTATGTATA
 TAGTTAGGATGTTTTGATTTCCGGTAAAAAATATATGTCCCATCGTTGCTATCACCAGTACCTCTCAGCTT
 ACTCTCAGGGATATGAACAATCTGTAGATTGGGTTTCCATAACAGGGAAGTCCGTCCTATGCCAAAG
 TTTCTAATTAATTGCTTAGTTCTGAGCCATTATTTCTGCTACACTTTGAAAGATATATTAGTTCTGACT
 TATGTTGGGGCTTTATTTTATTTTATTTTGTAGATGGAGTTTCACTCTGTGCCCAGGCTGGAGTG
 CAATAGCTCGATCTCGGCTCACTGCAACCTCGCTCCCTGGTTCAAGCAATTCTCCTGCCTCAGCGATTA
 CAGGAATGCACCACACGCCCCAGCTAATTTGTAGAGATGGGGTTTTCTCATGTTGGTCAGGCTGGTCTC
 AAACCTCTGACCTCAGTGATCGCGCCACCTCGCCCTTGCAAAATGCTGGGATTACAGGCATGAGCCACC
 TGCCCAGCCATGTTTGGGGCTTTATTTTATAAGTTAGAACTTTGAAGAGGAAATGGTGTATATGTTTAT
 TGTATTACTTTGTGTAACTTTGATGTAATGTTTATAAGCTATGAGAATCAGTTATAAAAGTATTAGCCA
 TTTGTTGTAATGCCAATAAAATATTACCAGGGGCAAGAATGTACATTTCTTTTTAGAAAACCAAATG
 TACTTTAGACATGAATGCACTATTTAAAGATAGCTTCATTTATGTTATTCTTACATGTCATAAGATT
 CTACTTAAACTTGGTCTCTTTCAAGTTGTTTGTATGAAGATGCTGTACCCACTTGAACAGTCTCAGG
 TGTTTACATAAATACTATGTTTTACAGTTTTTCATATTTTAAATATTAAAGTTAATCGCAACGATTC

RING1

SEQ ID NO:83

>gi|11863157|ref|NM_002931.2| Homo sapiens ring finger protein 1 (RING1), mRNA

GGCTGCTGTTTCTAAACCCCTTTCCCTCTAACCCACACCACCTTTCTACTCACTGATGCCCTCAGGAAG
 CCATAATGGATGGCACAGAGATTGCTGTTTCCCTCGGTCACTGCATTCAGAACTCATGTGCCCTATCTG
 CCTGGACATGCTGAAGAATACGATGACCACCAAGGAGTGCTCCACAGATTCTGCTCTGACTGCATTGTC
 ACAGCCCTACGGAGCGGGAACAAGGAGTGTCTACCTGCCGAAAGAAGCTGGTGTCCAGCGATCCCTAC
 GGCCAGCCCAACTTTGATGCCCTGATCTAAGATCTATCTAGCCGGGAGGAATACGAGGCCCATCA
 AGACCGAGTGCTTATCCGCTGAGCCGCTGCACAACAGCAGGCATTGAGCTCCAGCATTGAGGAGGGG
 CTACGCATGCAGGCCATGCACAGGGCCCCAGCGTGTGAGGCGGGCGATACCAGGGTCAGATCAGACCACAA
 CGATGAGTGGGGGGGAAGGAGAGCCCGGGGAGGGGAGAAGGGGATGGAGAAGATGTGAGCTCAGACTCCGC
 CCTGACTCTGCCCCAGGCCCTGCTCCCAAGCGACCCCGTGGAGGGGGCGAGGGGGGAGCAGTGTAGGG
 ACAGGGGAGGGGAGCTGGTGGGGTGGGTGGGGGTCGGGTTCCGAAGACTCTGGTGACCGGGGAGGGA
 CTCTGGGAGGGGGAACGCTGGGCCCCCCAAGCCCTCCTGGGGCCCCAGCCCCCAGAGCCGAGTGGAGA
 AATTGAGCTCGTGTCCGGCCCCACCCCTGCTCGTGGAGAAGGGAGAATACTGCCAGACGAGGTATGTG
 AAGACAACCTGGGAATGCCACAGTGGACCCTCTCCAAGTACTTGGCCCTGCGCATTGCCCTCGAGCGGA
 GGCAACAGCAGGAAGCAGGGGAGCCAGGAGGGCTGGAGGGGGCGCTCTGACACCGGAGGACCTGATGG
 GTGTGGCGGGGAGGGTGGGGGTGCCGAGGAGGTGACGGTCTGAGGAGCCTGCTTTGCCCAAGCTGGAG
 GGCGTCAGTGAAAAGCAGTACACCATCTACATCGCACTGGAGGCGGGGCGTTACGACGTTGAATGGCT
 CGCTGACCTGGAGCTGGTGAATGAGAAATCTGGAAGGTGTCCCGGCCACTGGAGCTGTGCTATGCTCC
 CACCAAGGATCCAAAGTGACCCACCAGGGGACAGCCAGAGGAAGGGGACCATGGGGTATCCCTGTGTCC
 TGGTCTATACCCAGCTTCTTTGTCCCCAGTACCCAGCCAGCCAGCCCAATAAGAGGACACAAATG

AGGACACGTGGCTTTTATACAAAGTATCTATATGAGATTCTTCTATATTGTACAGAGTGGGGCAAACAC GCCCCATCTGCTGCCTTTTCTATTGCCCTGCAACGTCCCATCTATACGAGGTGTTGGAGAAGGTGAAGA ACCCCTCCCATTCACGCCCGCTACCAACAACAAACGTGCTTTTTCTCTTTGAAAAA
<u>RYBP</u>
SEQ ID NO:84
>gi 6912639 ref NM_012234.1 Homo sapiens RING1 and YY1 binding protein (RYBP), mRNA
CCCGGACGGCGTTTCTCCTCCGAGCGGCGCCGGTTTCGGCTTGGGGGGGGCGGGGTACAGCCCATCCATG ACCATGGGCGACAAGAAGAGCCCGACAGGCCAAAAGACAAGCGAAACCTGCCGAGACGAAGGGTTT GGGATGTAGCGTCTGCACCTTCAGAAACAGTGTGAAGCCTTTAAATGCAGCATCTGCGATGTGAGGAA AGGCACCTCCACCAGAAAACCTCGGATCAATTCTCAGCTGGTGGCACAACAAGTGGCACAACAGTATGCC ACCCACCACCCCTTAAAGAGAGAAGAAGGAGAAAGTTGAAAAGCAGGACAAAGAGAAACCTGAGAAAG ACAAGGAAATTAGTCCTAGTGTACCAAGAAAAATACCAACAAGAAAAACCAACCAAGTCTGACATTCT GAAAGATCCTCCTAGTGAAGCAACAGCATACAGTCTGCAATGCTACAAACAAAGACCAGCGAAACAAAT CACACCTCAAGGCCCGCTGAAAACGTGGACAGGAGCACTGCACAGCAGTTGGCAGTAACCTGTGGGCA ACCTCACCGTCATTATCACAGACTTTAAGGAAAAGACTCGCTCCTCATCGACATCCTCATCCACAGTAC CTCCAGTGCAGGGTCAGAACAGCAGAACAGAGCAGCTCGGGGTCAGAGAGCACAGACAAGGGCTCCTCC CGTTCCTCCACGCCAAAGGGCGACATGTGACAGTCAATGATGAATCTTCTGAAATTGCACATGGAATT GTGAAAACATATGAATCAGGGTATGAAATTCAAACCTCCACCTGCCCATGCTGCTTGCATCCCTGGAGAA TCTTCTGTGGACATCGACCTCTTAGTGATGCTGCCAGGATAATTTCTGCTTGGCATGGGCATCTGGCCAC CAAGGAATTTGCGACCTGACGATTACTCTTGACACTTTTATGTATTCCATTGTTTATATGATTTCCT AACATCATTATATAATTGGATGTGCTCCTGAATCTACTTTTATAAAAAAAAAAAAA
<u>MLL</u>
SEQ ID NO: 85
>gi 5174568 ref NM_005933.1 Homo sapiens myeloid/lymphoid or mixed- lineage leukemia (trithorax homolog, Drosophila) (MLL), mRNA
ATGGCGCACAGCTTCTCGTGCGCTTCCCGCGCGACCCGGGACCCGGGGCGGCGCGCGCGGGGGG GCCGGGGCTAGGGGGCGNCCCGCGGCAACGCGTCCCGGCCCTGCTGCTTCCCCCGGGGCCCGGTCGG CGGTGGCGGGCCCCGGGGCGCCCCCTCCCCCGGCTGTGGCGGGCGGGCGGGCGGGCGGGGAAGCAGC GGGGCTGGGGTTCCAGGGGGAGCGGCCGCGCCTCAGCAGCCTCCTCGTCCGCTCGTCTTCGTCTT CGTCACGTCCTCAGCCTCTTCAGGGCGGGCCCTGCTCCGGGTGGGGCCGGGCTTCGACGCGGCGCTGCA GGTCTCGGCGCCATCGGCACCAACCTGCGCGGTTCCGGGCGGTGTTGGGGAGAGCGGCGGGGAGGC GGCAGCGGAGAGGATGAGCAATTCTTAGGTTTGGCTCAGATGAAGAAGTCAGAGTGCGAAGTCCACAA GGTCTCCTTCAGTTAAACTAGTCTCGAAAACCTCGTGGGAGACCTAGAAGTGGCTCTGACCGAAATTC AGCTATCCTCTCAGATCCATCTGTGTTTCCCTCTAAATAAATCAGAGACCAATCTGGAGATAAGATC AAGAAGAAAGATTCTAAAGTATAGAAAAGAAGAGGAAGACCTCCACCTTCCCTGGAGTAAAAATCA AAATAACACATGCGAAAGGACATTCAGAGTTACCAAAAGGAAACAAAGAAGATAGCCTGAAAAAATTA AAGGACACCTTCTGCTACGTTTCAGCAAGCCACAAAGATTAAAAAATTAAGAGCAGGTAAACTCTCTCT CTCAAGTCTAAGTTTAAGACAGGGAAGCTTCAATAGGAAGGAAGGGGTACAAATTGTACGACGGAGAG GAAGGCCTCCATCAACAGAAAGGATAAAGACCCCTTCGGTCTCCTCATTAAATTCTGAACTGAAAAGCCC CAGAAAGTCCGGAAGACAAGGAAGGAACACCTCCACTTACAAAAGAAGATAAGACAGTTGTGACACAAA GCCCTCGAAGGATTAAAGCCAGTTAGGATTATTCCTTCTTCAAAAAGGACAGATGCAACCATGCTAAGCA ACTCTTACAGAGGGCAAAAAAGGGGGCTCAAAAGAAAATTGAAAAAGAAGCAGCTCAGCTGCAGGGAAG AAAGGTGAAGACACAGGTCAAAAATATCGACAGTTCATCATGCTGTTGTGTCAGTGTATCTCCTCGCGG ATCATTAAAGACCCCTCGGCGGTTTATAGAGGATGAGGATTATGACCCCTCCAATTAATAATGCCCCGATTAG AGTCTACACCGAATAGTAGATTAGTGCCTCTGATCTAGTAGCCCGAGTGTGATACCTCCACAGACTCT GCACTCCTCTCAAATGTCTTCACTCCTCTCGATCTAGTAGCCCGAGTGTGATACCTCCACAGACTCT CAGGCTTCTGAGGAGATTAGGTACTTCTGAGGAGCGGAGCGATACCCCTGAAGTTCATCCTCCACTGC CCATTTCCAGTCCCCAGAAAATGAGAGTAATGATAGGAGAAGCAGAAGGTATTAGTGTGCGAGAGAAG TTTTGGATCTAGAACGACGAAAAATATCAACTCTACAAAGTGCCCCCAGCAGCAGACCTCCTCGTCT CCACCTCCACCTCTGCTGACTCCACCGCCACCACTGCAGCCAGCCTCCAGTATCTCTGACCACACACCTT GGCTTATGCTTCAACATCCCTTAGCATCACTTCTTCTGCTGCTTCCACTGCTCTATGCAAGGGAA GCGAAATCTATTTGCGAGAACCGACATTTAGGTGGACTTCTTTAAAGCATTCTAGGTGAGAGCCCAA TACTTTTCTCAGCAAAGTATGCCAAAGAAGGTCTTATTCGCAACCAATATTTGATAATTTCCGACCCC CTCCACTAACTCCCGAGGACGTTGCTTTGCATCTGGTTTCTGTCATCTGGTACCGCTGCTTCAGCCCG ATTGTTTTCGCCACTCCATTCTGGAACAAGGTTTGATATGCACAAAAGGAGCCCTCTTCTGAGAGCTCCA AGATTTACTTCAAGTGAGGCTCACTAGAAATTTGAGTCTGTAACCTTGCCTAGTAATCGAACTTCTG CTGGAACATCTTCTCAGGAGTATCCAATAGAAAAGGAAAAGAAAGTGTATTAGTCTATTGATCTGA

ACCAAGATCTCCTTCTCACTCCATGAGGACAAGAAGTGGGAAGGCTTAGTAGTTCTGAGCTCTCACCTCTC
 ACCCCCCCGTCTTCTGTCTCTTCTCCTCGTTAAGCAATTTCTGTAGTCTCTTGCCACTAGTGCCTTAAACC
 CAACTTTTACTTTTCTTCTCATTCCCTGACTCAGTCTGGGGAATCTGCAGAGAAAAATCAGAGACCAAG
 GAAGCAGACTAGTGCTCCGGCAGAGCCATTTTCATCAAGTAGTCTACTCCTCTCTTCCCTTGGTTTACC
 CCAGGCTCTCAGACTGAAAGAGGGAGAAAAAAGACAAGGCCCCGAGGAGCTGTGCAAGATCGAGATG
 CTGACAAGAGCGTGGAGAAGGACAAGAGTAGAGAGAGAGACCGGGAGAGAGAAAAAGGAGAATAAGCGGGA
 GTCAAGGAAAGAGAAAAAGGAAAAAGGGATCAGAAATTCAGAGTAGTTCTGTCTTTGTATCCTGTGGCTAGG
 GTTTCCAAAGAGAAGGTTTGTGGTGAAGATGTTGCCACTTCATCTTCTGCCAAAAAGCAACAGGGCGGA
 AGAAGTCTTCATCACATGATTCTGGGACTGATATTACTTCTGTGACTCTTGGGGATACAACAGCTGTCAA
 AACCAAAATACTTTATAAGAAAGGGAGAGGAAATCTGGAAAAACCAACTTGGACCTCGGCCCAACTGCC
 CCATCCCTGGAGAAGGAGAAAAACCTCTGCTCTTCCACTCCTTCATCTAGCACTGTTAAACATTCCACTT
 CCTCCATAGGCTCCATGTGGCTCAGGCAGACAGCTTCCAATGACTGACAAGAGGGTTGCCAGCTCCT
 AAAAAGGCCAAAGCTCAGCTCTGCAAGATTGAGAAGAGTAAGAGTCTTAAACAAACCGACAGCCCAAA
 GCACAGGGTCAAGAAAGTGAATCATCAGAGACCTCTGTGCGAGGACCCCGGATTAAACATGTCTGCAGAA
 GAGCAGCTGTTGCCCTTGGCCGAAAACGAGCTGTGTTTCTGATGACATGCCACCTGAGTGCTTACC
 ATGGGAAGAACGAGAAAAAGATTTTGTCTTCCATGGGGAATGATGACAAGTCATCAATTGCTGGCTCAGAA
 GATGCTGAACCTCTTGTCTCCACCCATCAACCAATTAAACCTGTGACTAGAAAACAAGGCACCCAGGAAC
 CTCCAGTAAAGAAAGGACGTGATCGAGGGCGGTGTGGGCAGTGTCCCGGCTGCCAGGTGCTGAGGACTG
 TGGTGTGTGTACTAATTGCTTAGATAAGCCCAAGTTTGGTGGTGCAGTAATAAAGAAGCAGTGCTGCAAG
 ATGAGAAAATGTGAGAATCTACAATGGATGCTTCCAAAGCCTACCTGCAGAAGCAAGCTAAAGCTGTGA
 AAAAGAAAGAGAAAAAGTCTAAGACCAGTGAAAAGAAAGACAGCAAGAGAGCAGTGTGTGAAGAAGCT
 GGTGGACTCTAGTCAGAAACCTACCCATCAGCAAGAGAGGATCTTGGCCCAAGAAAAGCAGTAGTGAG
 CCTCTTACGAAAAGCCCGTCGAGGAAAAGAGTGAAGAAGGGAATGTCTCGGCCCTGGGCTGGAATCCA
 AACAGGCCACCACTCCAGCTTCCAGGAAGTCAAGCAAGCAGGTCTCCAGCCAGCACTGGTTCATCCCGCC
 TCAGCCACCTACTACAGGACCGCCAAGAAAAGAGTTCCCAAAACCACTCCTAGTGAGCCCAAGAAAAAG
 CAGCTCCACCACCAGAATCAGGTCCAGAGCAGAGCAACAGAAAAAGTGGCTCCCGGCCCAAGTATCC
 CTGTAAAAACAAAACCAAGAAAGGAAAAACCACTCCGTCATAAGCAGGAGAATGCAGGCACCTT
 GAACATCTCAGCACTCTCTCAATGGCAATGATTCTAAGCAAAAAATTCAGCAGATGGAATCCACAGG
 ATCAGAGTGGACTTTAAGGAGGATTGTGAAGCAGAAAAATGTGTGGGAGATGGGAGGCTTAGGAATCTTGA
 CTTCTGTCTCTATACACCCAGGGTGGTTTGTCTTCTGTGTGCCAGTAGTGGGCATGTAGAGTTTGTGTA
 TTGCCAAGTCTGTTGTGAGCCCTTCCACAAGTTTGTGTTAGAGGAGAACGAGCGCCCTCTGGAGGACCAAG
 CTGGAATTTGGTGTGTGCTGTTGCAATTCGTGACGTTTGTGGAAGGCAACATCAGGTCACAAAGC
 AGCTGCTGGAGTGTAAATAAGTGCCGAAACAGCTATCACCTGAGTGCTGGGACCAACTACCCCAACAA
 ACCCAACAAGAAGAAGAAAGTCTGGATCTGTACCAAGTGTGTGCTGTGAAGAGCTGTGGATCCACAAT
 CCAGGCAAGGGTGGGATGCACAGTGGTCTCATGATTTCTCACTGTGTGATGATTGGGCCAAGCTCTTTG
 CTAAGGAAACTTCTGCCCTCTCTGTGACAAATGTTATGATGATGATGACTATGAGAGTAAGATGATGCA
 ATGTGGAAGTGTGATCGCTGGGTCCATTCCAAATGTGAGAATCTTTAGATGAGATGTATGAGATTCTA
 TCTAATCTGCCAGAAAGTGTGGCCTACACTTGTGTGAACGTGACTGAGCGGCACCCTGCAGAGTGGCGAC
 TGGCCCTTGAAAAGAGCTGCAGATTTCTGTAAGCAAGTCTGACAGCTTTGTTGAATCTCGGACTAC
 CAGCCATTTGCTACGCTACCGGCAGGCTGCCAAGCCTCCAGACTTAAATCCCGAGACAGAGGAGAGTATA
 CCTTCCCGCAGCTCCCCCGAAGGACCTGATCCACCAGTTCTTACTGAGGTGAGCAACAGGATGATCAGC
 AGCTTTTAGATCTAGAAGGAGTCAAGAGGAAGATGACCAAGGGAATTACACATCTGTGTTGGAGTTCAG
 TGATGATATTGTGAAGATCATTCAAGCAGCCATTAAATTCAGATGGAGGACAGCCAGAAATTAAGAGGCC
 AACAGCATGGTCAAGTCTTCTTATTCCGCAATGGAACGTGTTTTCATGGTTTCAAGTGTCAAAAAGT
 CCAGGTTTGGGAGCCAAATAAAGTATCAAGCAACAGTGGGATGTTACCAACGCAGTGCTTCCACCTTC
 AACTGACCATAATTATGCTCAGTGGCAGGAGCGAGGAAAAACAGCCACACTGAGCAGCTCCTTTAATG
 AAGAAATCATTCCAGCTCCCAACCCAAAGGCTCGGAGAACAGACTACCAACTCCTCTGCATCCTC
 CTACACCACCAATTTGAGTACTGATAGGAGTGCAGAAGACAGTCCAGAGCTGAACCCACCCCCAGGCAT
 AGAAGACAATAGACAGTGTGCGTTATGTTGACTTATGGTGTGACAGTGCTAATGATGCTGGTGTGTTA
 CTATATATTGGCCAAAATGAGTGGACACATGTAAATTGTGCTTTGTGGTGCAGCGAAGTGTGTAAGATG
 ATGACGGATCACTAAAGAATGTGCATATGGCTGTGATCAGGGCAAGCAGCTGAGATGTGAATCTGCCA
 AAAGCCAGGAGCCACCGTGGGTTGCTGTCTCACATCCTGCACAGCAACTATCACTTCATGTGTTCCCGA
 GCCAAGAAGTGTGCTTTCTGGATGATAAAAAAGTATATTGCCAACGACATCGGGATTGATCAAAGGCG
 AAGTGGTTCTGAGAATGGATTTGAAGTTTTCAGAAGAGTGTGTTGGTGGACTTTGAAGGAATCAGCTTGAG
 AAGGAAGTTTCTCAATGGCTTGAACCAAGAAATATCCACATGATGATTGGGTCTATGACAATCGACTGC
 TTAGGAATTTCAATGATCTCTCCGACTGTGAAGATAAGCTCTTCTCTATGGATATCAGTGTTCAGGG
 TATGCTGGAGCAGCAGATGCTCGCAAGCGCTGTGTATATACATGCAAGATAGTGGAGTGGCGCTCCTCC
 AGTCGTAGAGCCGATATCAACAGCACTGTTGAACATGATGAAAAACAGGACCATGCCCCATAGTCCAACA
 TCTTTTACAGAAAGTTTCATCAAAAGAGAGTCAAAAACAGCTGAAATTATAAGTCTCCATCACCAGACC
 GACCTCCTCATTCACAAAACCTCTGGCTCCTGTTATTATCATGTCTCAAGGTCCCCAGGATTGGAAC
 ACCAGTTATTCTCAACACAGAGATCCCTGGCTGTGCGACCGTTGCCTTCTGCAGGAAGTCTTCAACCA
 ACCACTCATGAAATAGTCAAGTAGTATCCTCTTACTCTCTGACTTCAAGCATTGGCTCCAGGC
 GTCACAGTACCTCTTCTTATCACCAGCGGTCCAAACTCCGGATAATGTCTCCAATGAGAACTGGGAA
 TACTTACTCTAGGAATAATGTTTCTCAGTCTCCACCACCGGACCGCTACTGATCTGAATCAAGTGCC
 AAAGTAGTTGATCATGTCTTAGGGCCACTGAATTCAAGTACTAGTTTAGGGCAAAACACTTCCACCTCTT
 CAAATTTGCAAAGGACAGTGGTTACTGTAGGCAATAAAAAACAGTCACTTGGATGGATCTTCATCTCAGA

AATGAAGCAGTCCAGTGCTTCAGACTTGGTGTCCAAGAGCTCCTCTTTAAAGGGAGAGAAGACCAAAGTG
CTGAGTTCCAAGAGCTCAGAGGGATCTGCACATAATGTGGCTTACCTTGAATTCCTAAACTGGCCCCAC
AGGTTTATAACACAACATCTAGAGAACTGAATGTTAGTAAATCGGCTCCTTTGCTGAACCTCTTCAGT
GTCGTTTCTTCTAAAGAGGCCCTCTCCTTCCACACCTCCATTGAGAGGGCAAAGGAATGATCGAGAC
CAACACACAGATTCTACCCAATCAGCAAACTCCTCTCCAGATGAAGATACTGAAGTCAAAACCTTGAAGC
TATCTGGAATGAGCAACAGATCATCCATTATCAACGAACATATGGGATCTAGTTCCAGAGATAGGAGACA
GAAAGGGAAAAAATCCTGTAAAGAACTTTCAAAGAAAAGCATTCCAGTAAATCTTTTTTGAACCTGGT
CAGGTGACAACCTGGTGAGGAAGGAACTTGAAGCCAGAGTTTATGGATGAGGTTTTGACTCCTGAGTATA
TGGGCCAACGACCATTGAACAATGTTTCTTCTGATAAGATTGGTGATAAAGGCCCTTCTATGCCAGGAGT
CCCCAAGCTCCACCCATGTAAGTAGAAGGATCTGCCAAGGAATTACAGGCACCACGGAACGCACAGTC
AAAGTGACACTGACACCTCTAAAAATGGAATGAGAGTCAATCCAAAAATGCCCTGAAAGAAAGTAGTC
CTGCTTCCCCTTTGCAATAGAGTCAACATCTCCACAGAACCAATTTACGCCCTGAAAATCCAGGAGA
TGGTCCAGTGGCCCAACCAAGCCCCAATAATACCTCATGCCAGGATTCTCAAAGTAACAACTATCAGAAT
CTTCAGTACAGGACAGAAACCTAATGCTTCCAGATGGCCCCAAACCTCAGGAGGATGGCTCTTTTAAAA
GGAGGTATCCCCGTCGCAGTGCCCGTGCACGTTCTAACATGTTTTTTGGGCTTACCCACTCTATGGAGT
AAGATCCTATGGTGAAGAAGACATTCCATTCTACAGCAGCTCAACTGGGAAGAAGCGAGGCAAGAGATCA
GCTGAAGGACAGGTGGATGGGGCCGATGACTTAAGCACTTCAGATGAAGACGACTTATACTATTACAACCT
TCACTAGAACAGTGATTTCTTCAAGGTGGAGAGGAACGACTGGCATCCCATAAATTTATTTCCGGGAGGAGGA
ACAGTGTGATCTTCCAAAAATCTCAGTGGATGGTGGTGGATGATGGGACAGAGAGTGATACTAGTGT
ACAGCCACAACAAGGAAAGCAGCCAGATTCCAAAAAGAAATGGTAAAGAAAAAGGACAGAGAACTTAA
AGATTGATAGACCTGAAGATGCTGGGGAGAAAGACATGTCACTAAGAGTTCTGTTGGCCCAAAAAATGA
GCCAAAGATGGATAACTGCCATTCTGTAAGCAGAGTTAAACACAGGGACAAGATTCTTGAAGCTCAG
CTCAGCTCATTGGAGTCAAGCCGACAGAGTCCACACAAGTACCCCTCCGACAAAAATTTACTGGACACCT
ATAATACTGAGCTCTGAAATCAGATTGACAGAAATCAACAGTGAATGATGCTGGGAATATCCTGCCTTC
AGACATTATGGACTTTGTACTAAAGAATACTCCTCATGTCAGGCTTTGGGTGAGAGCCCAGAGTCATCT
TCATCAGAACTCCTGAATCTTGGTGAAGGATTGGGCTTGACAGTAATCGTGAAAAAGACATGGGTCTTT
TTGAAGTATTTTCTCAGCAGCTGCCTACAACAGAACTGTGGATAGTAGTGTCTCTCTCTATCTCAGC
AGAGGAACAGTTTGAAGTTGCCTCTAGAGCTACCATCTGATCTGTCTGTCTTGACCACCCGGAGTCCCACT
GTCCCAAGCCAGAACTCCAGTAGACTAGCTGTTATCTCAGACTCAGGGGAGAAGAGAGTAACCATCACAG
AAAAATCTGTAGCTCTCTGAAAGTGACCCAGCTGCTGAGCCAGGAGTAGATCCAACCTCTGAAGG
CCACATGACTCCTGATCATTTTATCCAAGGACACATGGATGCAGACCACATCTCTAGCCCTCCTTGTGT
TCAGTAGAGCAAGTTCATGGCAACAATCAGGATTTAACTAGGAACAGTAGCACCCCTGGCCTTCAGGTAC
CTGTTTCCCAACTGTTCCCATCCAGAACCAGAAATGATGTGCCCAATTTCTACTGATAGTCTTGGCCCGTC
TCAGATTTCCAATGCAGCTGTCCAGACCACTCCACCCACCTGAAGCCAGCCACTGAGAAACTCATAGTT
GTTAACAGAAACATGCAGCCACTTTATGTTCTCCAACTCTTCCAAATGGAGTGACCCAAAAATCCAAT
TGACCTCTTCTGTAGTTCTACACCCAGTGTGATGGAGACAAATACTTCAGTATTGGGACCCATGGGAGG
TGGTCTCACCTTACCACAGGACTAAATCCAAGCTTGCCAACCTCTCAATCTTGTTCCTTCTGTCTAGC
AAAGGATTGCTACCATGTCTCATCACCAGCACTTACATTCTTCCCTGCAGCTACTCAAAGTAGTTTCC
CACCACATCAGCAATCCTCTCAGGCCCTGCTTATGGGGTTTACGCTCCTCCGGATCCCCAATTTT
GGTTTCAGAAATCCAGCCAGAGGACAGACCTCAGTACAGTACGCACTCCATCCTCTGGACTCAAGAAA
AGACCCATATCTGCTACAGACCCGAAAGAATAAAAACTTGCTCCCTCTAGTACCCCTTCAAACATTG
CCCCTTCTGATGTGGTTTCTAATATGACATTGATTAACCTTACACCCCTCCAGCTTCTAATCATCCAAG
TCTGTTAGATTGGGGTCACTTAATACTTCACTTCCACGAACGTGTCCTCAACATCATAAAAAGATCTAAA
TCTGACATCATGTATTGTAACCGGCACCCCTGTACCACAGAGTGTGGGAGGAACTGCTGCCACAGCGG
CAGGCACATCAACAATAAGCCAGGATACTAGCCACCTCACATCAGGGTCTGTGTCTGGCTTGGCATCCAG
TTCTCTGTCTTGAATGTTGTATCCATGCAAACTACCACAACCCCTACAAGTAGTGCCTCAGTTCCAGGA
CAGCTCACCTTAACCAACCCAAGGTTGCTTGGTACCCAGATATTGGCTCAATAAGCAATCTTTTAAATCA
AAGCTAGCCAGCAGAGCCTGGGGATTGAGGACCGCTGTGGCTTTACCGCCAAGTTTCAAGGAATGTTTCC
ACAACCTGGGGACATCAGACACCCCTCTACTGCTGCTAACAATAACAGCGCATCTAGCATCTGTGTCTCCCC
TCCACTCAGACTACGGGCATAACAGCCGCTTACCTTCTGGGGAGCAGACGAACACTATCAGCTTCAGC
ATGTGAACCAAGCTCCTTGCAGCAAACTGGGATTCACTTCTCCAGCGTGATCTTGATTCTGCTTCAGG
GCCCCAGGTATCCAACCTTACCAGACCGTAGACGCTCCTAATAGCATGGGACTGGAGCAGAACAAAGGCT
TTATCCTCAGCTGTGCAAGCCAGCCCCACCTCTCTGGGGGTTCTCCATCCTCTCCATCTTCTGGACAGC
GGTCAGCAAGCCCTTCAAGTGCCGGTCCCACTAAACCAAAACCAAAACGGTTTTCAGCTGCCTCT
AGACAAAGGGAATGGCAAGAAGCACAAAGTTTCCATTGCGGACCAAGTTCTTCTGAAGCACACATTCCA
GACCAAGAAAGACATCCCTGACCTCAGGCACAGGGACTCCAGGAGCAGAGGCTGAGCAGCAGGATACAG
CTAGCGTGAGCAGTCTTCCAGAAAGAGTGTGGGCAACCTGCAGGGCAAGTCGCTGTTCTTCCGGAAGT
TCAGGTGACCCAAAAATCAGCAAAATGAACAAGAAAGTGCAAGCTTAAACAGTGGAAGAAGAGGAAAGT
AATTTAGCTTCCCACTGATGCTTGGCTTCAAGTGAAGCAAGAAAGCGGAAGGAAGCATTACTGAGAAAA
AACCAAGAAAGGACTTGTTTTTGAAATTTCCAGTGAATGAGTGGCTTTCAGATCTGTGCAGAAAGTATTGA
AGATGCTTGAAGTCATTGACAGATAAAGTCCAGGAAGCTCGATCAAATGCCCGCTTAAAGCAGCTCTCA
TTTGCAAGGTGTTAACGGTTTGAAGATGCTGGGGATTCTCCATGATGCAGTTGTGTTCTCTATTGAGCAGC
TGTCTGGTGCCAAGCACTGTGCAAAATTACAAATTCGTTTCCACAAGCCAGAGGAGGCCAATGAACCCCC
CTTGAACCTTACGGCTCAGCCAGGCTGAAGTCCACCTCAGGAAGTCAAGATTGACATGTTTAACTTCA
CTGGCTTCTAAACATCGTCAGCTCCTGAATAACAACCCCAATGAAGAAGAGGAGGAGTCAAGCTGA
AGTCAGCTCGGAGGGCAACTAGCATGGATCTGCCAATGCCATGCGCTTCCGGCACTTAAAAAAGACTTC

GGGGTGTCCTCCCTCCCACCCTCAATGAAGGCTCTAGAGCTGTTAGATGGGCTCAATCTCACCTCTTCCCATTCC
CCTGCTATCTCGGAGTGGTCTCTCTGGCTTCTCTTTCGAGCATCCTGGGGTTACCGGCCCTTACACACC
TACAGCAGCTCCCTTTTCAGCCCCAGCAGAGGGGCCCTGTGACGAGGAAAGGGTGCTTCTCCAGCTCCC
AGGCTCTGGAGGCCCTGCTCACCTCTGATAGCCACCACCCCTGCTGACGCTCCTCATGACCCAGGTAGA
TCCCATTCTGTCCCAGGCTCCGACTCTTCTGTTGCTGGGGGGCTTCTTCTCCAGTAAGCTGGCCACG
GGCGTCGSCCTGTGTCCCAAGCCCCTAGAGGCTCGAGGCCCCAGCAGTCTGGTTCACCCCTTTCTATGA
TAGACCACCTCCAGTCATGGCAAGTGCCCCCATCCCCAAGGCTCTGGGGAATCTGTGTCTCACACCCCC
TACTGAAGCTGCAAGCCAAGACAGAATGCCCTCAGGATCTAGATCTTGATATGTATATGGAGAACCCTGGAG
TGTGACATGGATAACATCATCAGTACCTGACCTCATGGATGAGGGCGAGGGACTGGAACTTCAACTTGGAGCCAG
ATCCCTGAGTCATGCCTGGAAGCTTTGTCCCCCTGCTTCAGATGTGGAGCCAGGCGTGTTCATATCTACTC
TTTACCTTGAGCCCTCCCCAGGAAATTTGGGACCCTGCTTTAGAGCTAGGGTGGGGTCTGGTCACACACA
GGTGTTTGAAGAAATTATAAGATAAAGCTCCCCCATCTGGGGACGATATGGGGAGGGAGATGGGAGGGGA
AAGGGGAGAGGGTTTTTCTCACTGTGCCAATTAGGGGGTAAGGGCCCCCTCTCAGGAGCCATCATCGGCTT
TCCCCATTCTACCCACTTAGGCTTTGTAGCAAGATGAGCAATGCTGTTGGAAATGTGAAGTACCAGTG
GCCTTACCCCTGCCTTTGGGAGCAGGATTTTTTTGTAGAGAGTCTTATCTGAGCTGAGCCAGGCTAGCTG
GAGCCTGGGATTTCTATGTCAGTGGCCCTTAGGCCAGTGATGTGCGGTGGGTGGGCTGTTTAGGGGATCT
GGAAGGGCCAAGGCTGAGCACTGGAGTGGCTCGCCAGGCCAAATCACCTTTAGAAGGCTGCAGATAACA
GAAAGGCTTTTATAAACTTTTAAAGAAATATAAACACAAATATAGAGATTTTTTTAAACATGGCAGGGTG
CTAGTGGTGGGCAGAATGCTTTTTTTTCTTTCTGAAGGCTTTGTGATAGTGACATGATACAAACACTACA
GACAATAAATATTAGGAGACACAGGGAAGTGGGGAGAGGTGGGGAGTAATAGTAAACACAGGGAAGAGCT
CCCCTACCGGACCAGGTATAGAGAAGGCTCTATGCAGAAATAGGTTAGAGTTTCCCTAAACAAAAAGCTAA
CCCAGTCCCCCTCATTCCTTCAACTGTGCTGGGAGTGTGGTGTGTAGGTTGAGGCCACCACTCTTCTA
TGACCCAGCATGGGTAGTGCTATGGTGGGAGAGTACATTGAAGGCCTGGAATTAGCTTGGGGCCAGGGA
AGGGACTGGGAGGGGAGAGAAGAGAAGGAGGGAAGGATTTAGGATGGTAAAGTTAGGTACAGAGACCTCC
CTGTTCAAGGCCCTGCACAGCTGTCCCTGCCCTTCTTCCCTTCCCTGACTGCAGGGGTATGTGGAAGT
GTGTGTGGCAGCAGGTCAGCGGGGAGGGGAGGAAACAGGGAAGGGGGAGCTGGGGAGCTTGGCTGAGGCTCT
GGGAAATGAGCAGGGATGGGGGGGGATGTGGATCAGGTTTACTAGCACCTGGGAGGAGGCCATCTGGGG
CTCCTTCTCCACCCAGCCCCCAAAGCAGCCCTTCCCCCAGTGCCTTTGCATCGTCCCTCCCCCACC
CTGCTGTGGGTTCCCATCATTTCTGTGTGAGCGCCTGGCTACCCAGATTGTATCATGTGCTAGATTGG
AGTGGGGAAGTGTGTCAAATCAATAAATGAATAAATTCATAAATGCCTATAACCAGCAGAAAAAAA
AAAAAAAAAAAAAAAAAAAA

MLLT6

SEQ ID NO:88

```
>gi|5174576|ref|NM_005937.1| Homo sapiens myeloid/lymphoid or mixed-  
lineage leukemia (trithorax homolog, Drosophila); translocated to, 6  
(MLLT6), mRNA
```

[illegible]

GGACCTCGGCCCTGCCCGCCTCAGCGCTCCCGTTACACAGCACCTCCCTCCTCTTCTGCTTCTAT
CTCCACCACTCAGGTGTTTTCTCTGGCTGGCTCTACCTTTAGCCTCCCTTCTACCCACATCTTTGGAACC
CCCATGGGTGCCGTTAATCCCTCCTCTCCCAAGCTGAGAGCAGCCACACAGAGCCAGACCTGGAGGACT
GCAGCTTCCGGTGTGGGGGACCTCCCTCAGGAGAGTCTGTCTTCCATGTCCCCCATCAGCAGCCTCCC
CGCACTCTTCGACCAGACAGCCTCTGCACCTGTGGGGGCGGCCAGTTAGACCCGGCGGCCCCAGGGACG
ACTAATGGAGCAGCTTCTGGAGAAGCAGGGCGCAGGGGAGGCCGGCGTCAACATCGTGGAGATGCTGA
AGGCGCTGCACGCGCTGCAGAAGGAGAACAGCGGCTGCAAGAGCAGATCCTGAGCCTGACGGCCAAAAA
GGAGCGGCTGCAGATTCTCAACGTGCAGCTCTCTGTGCCCTTCCCTGCCCTGCCTGCTGCCCTGCCCTGCC
GCCAACGGCCTGTCCCTGGGCCCTATGGCCTGECTCCCAAGCCGGGAGCAGCGACTCCTTGAGCACCA
GCAAGAGCCCTCCGGGAAGAGCAGCCTCGGCCTGGACAACTCGCTGTCCACTTCTTCTGAGGACCCACA
CTCAGGCTGCCCGAGCCGACAGCCTCGTCGCTGTCTTCCACAGCACGCCCCACCCGCTGCCCTCCTC
CAGCAGACCCCTGCCACTCTGCCCTTGGCCCTGCCTGGGGGCCCTGCCCACTCCCGCCCCAGCCGACAGA
ACGGGTTGGGCCGGGCACCCGGGGCAGCGGGGCTGGGGGCCATGCCATGGCTGAGGGGCTGTTGGGGGG
GCTGGCAGGAGTGGGGGCCCTGCCCTCAATGGGCTCCTTGGGGGGTTGAATGGGGCCGCTGCCCCCAAC
CCCGCAAGCTTGAGCCAGGCTGGCGGGGCCCCACGCTGCAGCTGCCAGGCTGTCTCAACAGCCTTACAG
AGCAGCAGAGACATCTCTTACAGCAGCAAGAGCAGCAGCTCCAGCAACTCCAGCAGCTCCTGGCCTCCCC
GCAGCTGACCCCGAAACACAGACTGTTGTCTACCAAGATGATCCAGCAGATCCAGCAGAAACGGGAGCTG
CAGCGTCTGCAGATGGCTGGGGGCTCCAGCTGCCCATGGCCAGCCTGCTGGCAGGAAGCTCCACCCCGC
TGCTGTCTGCGGGTACCCCTGGCCTGCTGCCACAGCGTCTGCTCCACCCCTGCTGCCCGCTGGAGCCCT
AGTGGCTCCCTCGCTTGGCAACAACAAGTCTCATGGCCGAGCAGCTGCAGCTGCAGCAGTAGCAGCA
GCAGGCGGACCTCCAGTCTCACTGCCAGACCAACCCCTTCTCAGCCTGTGGGAGCAGAGGGCAGTG
GCGGTGGCCCCAAAGGAGGGACCGCTGACAAAGGAGCCTCAGCCAACCAGGAAAAAGGCTAA
MLLT4
SEQ ID NO:89
>gi 5174574 ref NM_005936.1 Homo sapiens myeloid/lymphoid or mixed- lineage leukemia (trithorax homolog, Drosophila); translocated to, 4 (MLLT4), mRNA
ATGTCGCGGGCGGGCGGTGACGAGGAGCGGGCGGAAGCTGGCCGACATCATCCACCCTGGAACGCCAACCC
GGCTGGACCTGTTTCGAGATCAGCCAGCCAGCCAGGAGATTGGAGTTCCATGGAGTGATGAGATTTTATTT
TCAAGATAAAGCTGCTGGAACTTTGCAACAAATGTATTGGGTCTCTAGTACTGCCACCCTCAAGAT
GTAATCGAAACGCTCGCGGAGAAATTTGACCTGATATGCGAATGCTGTCTCTCCCAAGTATTCACTCT
ATGAAGTGCATGTGACGGGAGAAAGAAGATTGGATATAGATGAGAAACCTCTAGTTGTACAACCTGAATTG
GAACAAGATGATCGGGAAGGCAGATTGTTCTTAAAGATGAGAATGACGCCATTCTCTCTAAGGCTCAA
AGTAATGGACCTGAAAAGCAGGAAAAGAAGGGGTTATCCAGAACTTCAAGAGAACTCTCTCAAAGAAAG
AAAAGAAGGAAAAAAGAAGAGAGAAAAAGAGGCATTGCGACAGGCATCTGATAAAGATGATAGACCTTT
CCAAGGGGAGGATGTTGAAATTTCTGACTGGCTGCTGAGGTTTACAAAGACATGCCGGAACACAGCTTT
ACTCGAACCATTTCTAATCTGAGGTGGTTATGAAACGACGGAGGCAGCAAAATTTGGAAGAGAAATGC
AGGAATTTCCGAGCTCAGATGGCGGCCTGATTCAAGTGAACATTGAGAATTTATGCAGATAGTTTAA
ACCAATATTCCCTACAAGACAATCCTGCTGTCTACTACAGATCCTGCAGACTTTGCTGTGGCTGAAGCT
TTAGAGAAGTATGGTCTGGAAAAAGAAAACCTTAAGGATTACTGCATCGCCCGGGTTATGCTTCTCTCTG
GAGCCAGCATTCTGATGAAAAGGGTGCTAAAGAAATTAATCTTGATGATGATGAGTGTCTTTTACAAT
CTTCAGGGAATGGCCAAGTGACAAAGGGATTTAGTCTTTTCAAGTGAAGAGGAGGCCACAGACCACATC
CCAAAGAAAACCAAGAACTTGGAAAGGCAAGACCCAAAGGGAAGAGAGAGATGACGGGTCTGTCT
ATGGCTCCACCCCTTCTCCGGAGAAGCTGCCCTATTCTAGTAGAGTTAAGCCAGATGGTTCTGACTCTAG
AGATAAGCCAAAGCTTTACCGCCTTCAGTTAAGTGTACTGAAGTTGGACAGAAAAGTTGGATGACAAC
TCTATCCAGTTGTTTGGCCAGGAATTCAGCCCATCACTGTGACCTTACCAACATGGATGGAGTGGTCA
CTGTGACGCCCAGAAGTATGGACGCAGAAACCTACGTGGAAGGCCAGCGCATCTCAGAAACCACCATGCT
GCAGAGTGGCATGAAAGTGCAGTTTGGGGCGTCCCATGTATTAAAGTTGTGGACCCAGTCAGGATCAT
GCTCTTGCAAAAGATCTGTGGATGGAGGCTGATGGTTAAGGGCCCAAGACATAAACCTGGAATTGTTT
AGGAGACAACTTTTGATTTGGGAGGAGATATTCATAGTGGGACAGCATTACCGACAAGCAAGAGCACCAC
TAGGCTGGACAGCGACAGAGTGTGCTCTGCCTTAGCACAGCCGAGCGGGGAATGGTGAAGCCGATGATC
AGAGTAGAACACAGCAGCCAGATTATCGCAGGCAAGAAAGCAGAACACAGGATGCTTCTGGGCCCTGAGCTGA
TACTACCTGCAAGCATTGAATTCAGGGAAGTTCTGAAGATTCAATTTTGTCTGCCATTATAAATTATAC
TAATAGCTCTACAGTCCACTTTAAGTTGTCCCTACATATGTATTATATATGGCATGCCGGTATGTATTG
TCCAACCACTACAGACCTGACATCAGCCCTACAGAGCGCACACATAAAGTCATTGCAGTCTGCAACAAGA
TGTTGAGCATGATGGAGGTTGTCATCCAGAAACAGAAATATTGCAGGGGCACTTGCCCTTCTGGATGGC
AAATGCATCTGAACCTTCTCAACTTCATTAAAGCAAGACCGAGACCTTAGTCGGATCACACTGGATGCTCAA
GATGTTTTAGCACATTTGGTTCAAAATGGCATTTAAATACTTGGTTCACTGTCTTCAATCAGAACTTAATA
ATTACATGCCAGCCTTTCTAGATGACCTGAAGAGAACAGTCTGCAACGACCAAAAAATAGATGATGTGCT
GCACACGCTCACAGGAGCCATGTCCTTGCTACGACGCTGCAGAGTCAATGCCGCCCTGACCATCCAGCTC
TTCTCTCAGCTCTTCCACTTCATCAATATGTGCTGTTCAATAGATTGGTGACCGACCCAGATTCCGGGGC
TGTGCTCCCATTAAGTGGGGTGCGATTATCCGTCAGCAGTTGGGGCATATTGAAGCCTGGGCTGAGAAGCA
GGGGCTGGAACCTGGCTGCGGACTGTCTGAGCAGGATCGTGACGGCAACGACTTTGCTTACCATGGAT

<p>AAGTATGCACCTGATGACATTCCAAATATAAAACAGCACCTGCTTTAAGTTAAATTCATTACAACCTTCAAG CCTTATTACAGAACTATCACTGTGCACCTGATGAGCCTTTTATCCCAACGGATCTTATAGAAAATGTAGT GACTGTGGCTGAAAACACTGCCGATGAGCTGGCCCCGAGTGATGGAAGGGAAGTGCAGTTGGAGGAGGAT CCTGATCTGCAGCTGCCGTTTCTTTTGCCAGAAGATGGTTATCTTGTGATGTTGTCAGAAAACATTCCAA ATGGTTTACAAGAAATTTTAGACCCTCTGTGCCAGAGAGGATTTTGAGGTTAAATCTCTCACACACGTTT ACCAGGTACTTTGGACAATATATTTTGAAGGTGCAGATTATGAAAGTCACCTTCTGCGTGAGAACACAGAG CTGGCTCAGCCTCTGAGGAAAGAACCTGAAATAATCACTGTGACCCTAAAAAAGCAGAAATGGAATGGGCC TTAGCATTTGTTGCAGCAAAAGGGTGCTGGTCAAGATAAACTAGGAATCTACGTGAAGTCGGTTGTGAAAG AGGTGCTGCAGATGTGGATGGACGCTGATCACTGCAGGTGATCAGCTCCTCAGTGTGGATGGACGAGGCTG GTTGGACTCTCTCAGGAAAGGGCGGCAGAACTCATGACAAGAACAGCTCTGTGGTGACACTGGAAGTAG CAAAGCAGGGTGCCATCTACCACGGCTGTGGCCACCCTTCTCAATCAGCCATCCCCCATGATGCAGAGAAT TTCAGATCGTCTGTGCTCAGGTAAACCCCGACCAAAGAGTGAAGGCTTTGAGCTCTATAATAATTCAACT CAAAATGGGTCTCCTGAGAGTCTCAGCTGCCTTGGGCAGAAATATAGTGAACCAAAGAAATGTCCTGGTG ATGACAGACTGATGAAAATAAGAGCTGATCACCGTTCCAGCCCAACGTGACCAATCAGCCTCCTAGTCC TGGAGGGAAGAGTGCATATGCCTCTGGAAACACAGCGAAGATAACATCTGTCTCTACTGGAAACCTCTGC ACTGAGGAGCAGACGCTCCGCTAGACCTGAAGCCTACCCCATCCCACTCAGACGTACACCAGAGAGT ATTTTACCTTCCAGCTTCCAAATCCCAGGATCGGATGGCTCCTCCTCAGAACCAGTGGCCAAATTATGA GAAAAGGCCACATAGTGCACACAGATAGTAATCATTCCAGTATTGCAATTAGCGGTGTACACGTTCCAA GAAGAACTTCGATAGGATAAAGCTTACCAACTTGAGCGGCATCGAATAGAGGCAGCTATGGACCGGAAAGT CTGATAGTGATATGTGGATAAATCAGAGCTCCTCACTGGACTCCAGTACCTCTAGCCAGGAGCATCTGAA CCATTCTCTAAGTCGGTCAACCCTGCTTCCACACTGACCAAAAGTGGCCCTGGCCGTTGGAAAAACCCA GCAGCCATACCGGCCACCCCTGTGGCCGCTCTCCAGCCCAATCCGAAACAGACCTGCCTCCGCCACCCCGC CACCTCCAGTCCCATATGCGCGGTGATTTCGATGGAATTGCCATGGATTGCTTCCCAACCCCTTC CGCCAACAGATAGGGCTGCCGTCTGCGCAGGTGGCTGCTCTGAACGGGAGAAAGAGAGAAAGAACATCAG CGTTGGTATGAGAAGGAGAAGGCCCCCTGGAGGAGGAGCGGGAGAGGAAGCGGAGAGAGCAGGAGAGGA AGTTGGGCCAGATGCGCACTCAGTCTTAAACCTGCTCCGTTTCTCCCTGACTGCACAGCAGATGAA GCCCGAAAAGCCTTCCCACTCCAGCGGCCACAGGAAACAGTCAATTCGGGAGCTGCCCTCAGCAGCAG CCCCGACAGCTCAGCGCAGAGACTTGCACTACATTACAGTCAAGAAAGAGGAGCTTCTCTCGGGGGACA GTCTGTCCCCGACCCGTTGGAAGCGGGACGCCAAGGAGAAGCTGGAGAAGCAGCAGCAGATGCATCTGT GGACATGCTGAGCAAGGAGATCCAGGAGCTCCAGAGCAAACCGGACCGCAGCGCCGAGGAGAGCGACCGG CTGCGCAAGCTCATGCTGGAGTGGCAGTTCCAGAAGAGACTCCAGGAGTCAAGCAGAGAGGACGAAGATG ACGAGGAGGAGGAGGACGATGATGTGGACACCATGCTGATCATGCAGCGCCTGGAGGCTGAACGAAGAGC GAGGTTAAAGGGGGAGTGCTTTGGCTGTGCCCATCTGTGGTCCCTATTTTAGCTTCTGCGTGTTCCTCA TGGGGATAG</p>
<p>MLLT3</p>
<p>SEQ ID NO:90</p>
<p>gi 4758719 ref NM_004529.1 Homo sapiens myeloid/lymphoid or mixed- lineage leukemia (trithorax homolog, Drosophila); translocated to, 3 (MLLT3), mRNA</p>
<p>TTTGGGGCTGAGTTTAATAAGCGAGCGAGCGAGCAAGCGAGCGCGGGGGGAAAAAGGCAGAGAATGTCCG CCATCTACCTCCGCTCCTGGGCGCGCTCTCATTATAGCAGCCTCTTCATGAATTACAGCTGAGGGGGG CGGAGGAGGGGGGGGTACACACAACACCCAGCAAACCTCCGGGCCCCAGGCATGGCTAGCTCGTGT TCCGTGCAGGTGAAGCTGGAGCTGGGGCACCGCGCCAGGTGAGGAAAAAACCACCGTGGAGGGCTTCA CCCACGACTGGATGGTGTTCGTACGCGGTCCGGAGCACAGTAACATACAGCACTTTGTGGAGAAAGTCGT CTTCCACTTGACAGAAAGCTTTCTTAGGCCAAAAAGAGTGTGCAAGATCCACCTTACAAAGTAGAAGAA TCTGGGTATGCTGGTTTCATTTTGCCAAATGAAGTTTATTTTAAAAACAAGGAAGAAGCTAGGAAAGTCC GCTTTGATTATGACTATTCTCTGCATCTTGAAGGCCATCCACCAAGTGAATCACCTCCGCTGTGAAAAGCT AACTTTCAACAACCCCAACAGAGGACTTTAGGAGAAAGTTGCTGAAGGCAGGAGGGGACCCTAATAGGAGT ATTCATACCAGCAGCAGCAGCAGCAGCAGTAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGTAGCA GCAGCAGCAGCAGCAGCAGCAGCAGTAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGTAGTACCAG TTTTTCAAAGCCTACAAATTAAATGAAGGAGCACAAGGAAAAACCTTCAAAGACTCCAGAGAACATATAA AGTGCCTTCAAAGAACCTTCCAGGGATCACAAACAACTTCCAAAGAATCCTCTAAGAAACCCAAAGAA ATAAACCACTGAAAGAAGAGAAAAATAGTTCCTAAGATGGCCTTCAAGGAACCTAAACCCATGTCAAAGA GCCAAACCCAGATAGTAACCTTACTACCATCACCAGTGGACAAGATAAGAAGGCTCCTAGTAAAGGCCG CCCATTTCAGATTCTGAAGAACTCTCAGCCAAAAAAGGAAAAAGATAGCTCAGAGGCTTTATTTAAAA GTTTTTCTAGCCCAACCACTGATACCTGTTCTGTGACAAAAACAGATAAAAGATAATTAATCTCA TGTCAGATGGGAAAGGTCAAATTTGAAGGTGAGACATCAGAGAAGAAGAAATCAACGTTACCGCCATT GATGATATTGTGGATCCCAATGATTGATGTGGAGGAGAATATATCCTCTAAATCTGATCTGAACAAC CCAGTCTCGCCAGCTCCAGCTCCAGCTCCAGCTCCAGCTTCAACCATCCAGAGCCAGGCAACCAAGGTTC TTTGAGTCTATAATGAAGATCTGCACTTGATGACAAATGAGGAGGAATCAGATGAAGTGGAGGATAAC GACAATGACTCTGAATGGAGAGGCCCTGTAAATTAGAGGAGGAGCCGAAGTCGAGAGTGTAGCTTAAGT GAGGTTAAAGGGGGAGTGCTTTGGCTGTGCCCATCTGTGGTCCCTATTTTAGCTTCTGCGTGTTCCTCA</p>

ATGGCAGCGATAGTGAAAGCAGTTCGTCTCTTACCCCTACATCACGAACCTCCACCACCCTTACTAAA AACCAACAACAACCAGATTCTTGAAGTGAAAAGTCCAATAAAGCAAAGCAAATCAGATAAGCAAATAAAG AATGGTGAAATGTGACAAGGCATACCTAGATGAACTGGTAGAGCTTACAGAAAGGTTAATGACATTGAGAG AAAGACACATTCTGCAGCAGATCGTGAACCTTATAGAAGAACTGGACACTTTTCATATCACAAACACAAC ATTTGATTTTGATCTTTGCTCGCTGGACAAAACACAGTCCGTAAACTACAGAGTTTACCTGGAAACATCT GGAACATCCTGAGGATATAACAACCTGGATGCATCAAGAACTATTGTGTTTTTTTTTTTGGTTTTTTTT TTTTTGGTTGTGATTTTTTGTCTTGTGTTTATATGAAAACACTCAAATGATGCAACCAAAGGGAAA AAATAAAAATCAAACAACCTTCAGCTTTATTTTTCTTTAAAGCCAGTCATCATCTCTTGATAAAGGAGAG GTTAAAGCAAACCAGCCTCAGCGGACCCTCTTCTCTCCAGGAAATCCCGGGGAAGAGTTAGCCTGGAT AGCCTTGAAAACAAACAAATCAAACACAACAAGAAAACCTCAAAGAATGTGTATGGTATCATGTATCTC TCTGTGGTGGTTTCATTCCACAGGACGAATGCATATTCAACACACTGCCTTATTACATAACTGATCTATTT ATTATCGCATACAGATATTCTAAGTCGTTGAGGGAATGACACCATCAGACATTATAAGTACTTGGTCCCG TGGATGCTCTTTCAATGCAGCACCTTGCCATCCCAAGCCAGTGACCTTACTCGTATACCGTGCCACTT TCCACCAACTTTTTCCAAGTCCTTTAACTCGTTGCAGTCTGTATTTTCCACCTTTTGTTTTTCCAGTTCC AGGACACAGATTATCAACTGGGGGACCAATAGCCACCTTGATTTTCTTCTTTGTGGTCTTTTTCCTGA AAGTTGGGGCCAGTCCTTGGCTGTATCCATGTAATGATCTTGGACCATGGTAGAAAATGCACCAATAG GATCATATGAATTGCTGTCTAGCCTTAGTCAATAAACTTGTAGGACTTTTAAACAAAAGTGACCTGTAA ATGTCCTGAATCCAGCATTGTTGAGCTGTATCAACATTCTGTGTCTGTTTTACTGTTTACAATATTAGG TGAATATGGAAGTAAAGGCATTCCACAGGATCATCATTTAAAAAAAAGAATTCTGGTCTGTTTTCTAA AAAAAAAACCTGTTGTAGAAATCTTAATTTGGATCTATTATTAGTCAGAGTTTCAGCTTTCTTCAGC TGCCAGTGTGTTACTCATCTTTATCTTAAAAATCTGGAATCAGAGATTTTGTGTTTTCATATGATTCT TCTTAGACACTTTTATATTTGAAAAAATTAATCTTTCTTTGGGGAAAAATCTTGGTTATTCTGCCAT AACAGATTATGTATTAACCTGTAGATTCAAGTGGTTCAATACCTGTTTAGTTGCTTGCTAATATTTCCAGA AGGATTTCTGTATTGGTGAAGACGGTTGGGGATGGGGGATTTTTTTGTTCTGTTGTACCTTGTGTT TGAAACTAGAAATCTGCTGTGCATGCAAAAGAAAGCAAATTATTTTAAAGAAAAAACCAAAGTA CTTTTGGTGTCAATTATTCATCTTCTCCATAAGTGAGGAAATGAAAGTAAGAACAGCTCATCTTCAAAG TTTTTACTAGAAATTC
MLLT2
SEQ ID NO:91
>gi 5174572 ref NM_005935.1 Homo sapiens myeloid/lymphoid or mixed- lineage leukemia (trithorax homolog, Drosophila); translocated to, 2 (MLLT2), mRNA
GGCAATTTCTTTTCTTTCTAACTGTGGCCCGCGTTGTGCTGTTGCTGGGCAGGCGTTGGGCGCCGGCGG TCTTCGAGCGTGGGGGCCCGCTGGCTTTCCCTTCTCAGAAACTGCGCCGGGGCGCTCGCTTGCCCCGGA TTCCGACGCGCGCTCCCCGGGCTCGTCTGAAGTGCAGATCGCCGCGAGAGGCCCCAGTGCCCGGATGTCC ATCAGGATTAGCGCGAGCCAAATACGGGCGGAGCCCGGGCTGCGCCGAGGACGCCCGGGGCTCGAGAGCA GGTAGTCCCGTAACATCGGGGCGCCGCGCCGGGACGCGTCCCGCGCCGCTCCGCCAAATGGTGAGCGCG GCGCTGGCAGCAGGGCCCGCGGGGTGAAGGCGCTCATGGACGGAAGACCCCTGGCTCTATAAGCTGAATT ATGGCAGCCCGTCAAGTTTGTACAATGACGACAGAAACCTGCTTCGAATTAGAGAGAAGGAAAGACGCA ACCAGGAAGCCACCAAGAGAAAGAGGCATTTCTGAAAAGATTCCCTTTTGGAGAGCCCTACAAGAC AGCAAAAGGTGATGAGCTGTCTAGTCAATACAGAACATGTTGGGAACTACGAAGAAGTGAAGGAGTTC CTTAGTACTAAGTCTCACACTCATCGCTGGATGCTTCTGAAAATAGGTTGGGAAAGCCGAAATATCCTT TAATTCCTGACAAAGGGAGCAGCATTCATCCAGTCTCTTCCACACTAGTGTCCACCACCAGTCCATTCA CACTCCTGCGTCTGGACCACTTTCTGTTGGCAACATTAGCCACAATCCAAAGATGGCGCAGCCAGAAGT GAACCAATGCCAAGTCTCCATGCCAAAAGCTGCGGCCACCGGACAGCCAGCACCTGACCCAGGATCGCC TTGGTCAGGAGGGGTTCCGCTCTAGTCAATCACAAGAAAGGTGACCGAAGAGCTGACGGAGACCACTGTGC TTCGGTGACAGATTCCGCTCCAGAGAGGGAGCTTCTCCCTTAATCTCTTTGCCTTCCCCAGTTCCCCCT TTGTCACTTATACATTCCAACCAGCAAACCTTCCCCGGACGCAAGGAAGCAGCAAGGTTTCATGGCAGCA GCAATAACAGTAAAGGCTATTGCCAGCCAAATCTCCCAAGGACCTAGCAGTGAAAGTCCATGATAAAGA GACCCCTCAAGACAGTTTGGTGGCCCTGCCAGCCGCTTCTCAGACATTTCCACCTCCCTCCCTCCCT TCAAAAAGTGTGCAATGCAGCAGAAGCCACGGCTTATGTCGGCCCCATGGATGGTCAAGATCAGGCCCT CTAGTGAATCCCCTGAACTGAAACCACTGCCGGAGGACTATCGACAGCAGACCTTTGAAAAACAGACTT GAAAGTGCCTGCCAAAGCCAAGCTACCAAACCTGAAGATGCCTTCTCAGTCAGTTGAGCAGACCTACTCC AATGAAGTCCATTGTGTTGAAGAGATTCTGAAGGAAATGACCCATTATGGCCGCTCCTTTGACAGCAA TACATACGCTTAGTACAGCTGAGCCATCCAAGTTTCTTTCCCTACAAAGGACTCTCAGCATGTCAAGTTC TGTAACCCAAAACCAAAAACAATATGATACATCTTCAAAAACCTCACTCAAAATCTCAGCAAGGAACGCTCA TCCATGCTCGAAGACGACCTTCAGCTCAGTGACAGTGAGGACAGTGACAGTGAACAAACCCAGAGAAGC CTCCCTCCTCATCTGCACCTCCAAGTGCTCCACAGTCCCTTCCAGAACCAGTGGCATCAGCACATTCCAG CAGTGACAGAGTCAGAAAGCACCAGTGACTCAGACAGTTTCTCAGACTCAGAGAGCGGAGAGCAGTTCAAGT GACAGCGAAGAAAATGAGCCCTAGAAACCCAGCTCCGGAGCCTGAGCCTCCAACACAAACAAATAGGC AGCTGGACAACCTGGCTGACCAAAGTCAGCCAGCCAGCTGCGCCACCAGAGGGCCCCAGGAGCACAGAGCC

```

CCCACGGCGGCACCCAGAGAGTAAGGGCAGCAGCGACAGTGCACAGTCAGGAGCATTCTGAATCCAAA
GATCCTCCCCCTAAAGAGCTCCAGCAAAGCCCCCGGGCCCCACCCGAAAGCCCCCAGCCGGAAGAGGA
GCTGTGAGAAGTCTCCGGCAGCAGGAGCCCCACAAAGGCAAACCGTTGGAACCAACAACCCAAAAA
ACCTGTCAAGGCCCTGCGCCGGGCAGGTTCAAGGACAGCCCTGCAGGGGGAAGGGAGCCAGGGCTTCTT
CCCTATGGCTCCCGAGACCAGACTTCCAAAGACAAGCCCAAGGTGAAGACGAAAGGACGGCCCCGGGCCG
CAGCAAGCAACGAACCAAGCCAGCAGTGCCTCCCTCCAGTGAGAAGAAGACACAAGAGCTCCCTCCC
TGCCCCCTCTAAGGCTCTCTCAGGCCAGAACCCGCGAAGGACAAATGTGGAGGACAGGACCCCTGAGCAC
TTTGCTCTTGTTCCTCTGACTGAGAGCCAGGGCCCCACCCACAGTGGCAGCGGCAGGAGCTAGTGGCT
GCCGCCAAGCCGTGGTGGTCCAGGAGGACAGCCGCAAGACAGACTCCCATTTGCCCTTTGAGAGACACCAA
GCTGCTCTCACCGCTCAGGGACACTCCTCCCCACAAAGCTTGATGGTGAAGATCACCTAGACCTGCTC
TCTCGGATACCCAGCCTCCCGGGAAGGGGAGCCGCCAGAGGAAAGCAGAAGATAAACAGCCGCCGCAG
GGAAGAAGCACAGTCTGAGAAGAGGAGCTCAGACAGCTCAAGCAAGTTGGCCAAAAAGAGAAAGGGTGA
AGCAGAAAGAGACTGTGATAACAAGAAAATCAGACTGGAGAAGGAAATCAAATCACAGTCATCTTCATCT
TCATCCTCCCAACAAGAATCTTCTAAACAAAGCCCTCCAGGCCCTCCTCAGCTCCTCAAAGAAGGAAA
TGCTCCCCCGGCCACCCGTGTCTCGTCTCCAGAACCCAGCCAGCCTGCACTTAAGAGGTCAAGGCG
GGAAGCAGACACCTGTGCCAGGACCCTCCCAAAGTGCCAGCAGTACCAAGAGCAACCACAAAGACTCT
TCCATTCCCAAGCAGAGAAGAGTAGAGGGGAAGGGCTCCAGAAGCTCCTCGGAGCACAAGGGTCTTCCG
GAGATACTGCAATCCTTTTCCAGTGCCTTCTTTGCCAAATGGTAACTCTAAACCAGGGGAAGCCCTCAAGT
GAAGTTTGACAAACAAACAGCAGACTTCCACATGAGGGAGGCAAAAAGATGAAGCAGAAAGCAGAGTTA
ATGACGGACAGGGTTGGAAGGCTTTTAAGTACCTGGAAGCCGTCTTGTCCTTCATTGAGTGCAGGAATTG
CCACAGAGTCTGAAAGCCAGTCATCCAAGTCAGCTTACTCTGTCTACTCAGAACTGTAGATCTCATTA
ATTATAATGTCTATAAATCCTTCTCAGATGCCACAGCGCCAACACAAGAGAAAATATTTGCTGTTTTA
TGCATGCGTTGCCATCCATTTTGAACATGGCGATGTTTCTGTTGTAAGAAAAGACATAGCAATAAAGTATT
TCTGATCTTCTAATAACACTTCGAGAGTTCTTCCAAGTCCGCCAGGCACCTTCTCCATGCATGCTCAAG
CACAGGCACACCATCCCTCTTTCCCAATGCCCTTCTCCTGCCAGCTCCGTAGGGTCCCAGTCAAGTGCT
GGCAGTGTGGGGAGCAGTGGGGTGGCTGCCACTATCAGCACCCAGTACCATCCAGAATATGACATCTT
CCTATGTCAACATCACATCCCATGTTCTTACCGCTTTGACCTTTGGGAACAGGCCGAGGCCCTCAGCAG
GAAGAATAAAGAATTTTGTCTCGGCTCAGCACAAATGTGTGCACCTTTGGCCCTCAACAGCAGTTTGGTG
GACCTGGTGCACTATACAGCAGGAGGTTTTTCAGCAGCTACAAGAAATTAACCAAAACACCTTAATGAGACC
CCAGGTTGATTCAATGCCTTGGGAACATTTTTTGACATTGGAAGCCTCAAAAACAGTCCAGACGTTTGT
TTCATCAGGACACCAACTCTAAAAAAGAAGCACCAGAGATGGCCAGGACATTTGTCCACTTAACTCT
CAACAACAGTGTGATCATTGGTTGGACACTGTGGTTATGCAGAAGCAGAGATGAGGAGGCTGGCCCCAGA
GATGATCTTGCCCTTCTAATAAAGGACAGAAGTGCAATTTAGCTTAAATGGGTGTATGAATGGTCTAG
AAACATTTCTATTTTTTTTTTAAACAGCAGATGCAAGTTGCAAAATGAATGAGGAGAAACAGTTTCAA
CTCTGAAAGTGAATTTACGTCATCTCAGTAGCCACGCTAGTCCATTTCCAGAAGGAAATTTTTTTTTT
AACATGACTTTTGTAAAGGGTTTTGTGGATGATTTTTTTTCTTTGAGTTTGGGAGAAATATTGTT
TAATAACTTCTAATGGCCATCTGTAAACCATAAGTAATGAAGGACTCCACTGTGCCCACTTTCTGCCAA
TGAACAGTGGCTTGATAATACCAAGTATTGTTGTAATTTATAAAATGAAGGCAACCCCGCTCCTGCCG
CCCCAATCTCCCATTTGCTAGAGCGCTGCACATGACCCAGCTCTGACTTCTCATTACTGTGCTGAA
AGTCAGCCACGTCGGAGCGGTGAGGAGGAGCCACAGCAGATGGGGTGCCACCTCGAGGTCTGCACAGGA
GGACTTGGCGCTGCCATTTCTACCCCTGCCATTTCCACCCCTGCTTCAGCGAAAGGGACTCTCTAACA
GGGAGTCACTGTTGACTCTATTCTGAATTTCTCCTTGGGGGAAGAGGGGAACCAACATTTATACCTGA
CCAGATGGCTAAAGTGCTTTTAAAGTTTTGTTTAAAGTAGAGTGGAAATTTGAGGTGCTGATCTGTGGTCT
ACAGTTATGGTAACTCATGTTTGTCCAGCCAACTCAGAGTTTCTGTCAGTGAACAAGAAACATGAATCT
GCTTCTTAGAGAGGCTATATTTTTCTGCTACAAATATTTTATATTTATAGCAAACTAGACTTTTCAGAGT
CCTTGATTGTCTAGGGGAAGTTAACTCCCTGAGAGGATGTAGAGATTTGGGGTGGTTGATTAGACTTTTG
AAAACTCATCACCATGCCTTCACTCCAGAGTGTCTCAGCTAGATTTGATTTGGTTGAGGAGGAACT
GTGGCCCTCCGTAAGTTATTGCCATAGTGTATGCATTAACCAAGTCCATTTTGAATGACCTAAATGAA
GTAACACAATCAGAAATCCCATGTGCCCATAAAGCACAGATTTTTCTTTTTCATTGAAACTTTAAAGGTTA
TTATTGGAACATTACTTTGAGTGCAGTGTTTTTAAAGCCAATTTCTTTTTATCCCTTTTAGAAGTAGA
ATTTGCACACTTACTACAATTGAGGAGTGTCTCTATAACTTTTTCTCCGCTTTGTCCCATTTGCC
CCTGGACATGTTTCTTACCAAGCATGTTTCACATTTCTCTATTAGTGAGGAGGGAGAACCATATTTATT
TATAATGAAGACATCTAAGATCCCTATGATGAATGCAGGAACCTCTTGGTAGTTTGTAATACACAAG
GGATGTGTGAGGATGGGAGCGATGCTTATCTCTCAGTGTGAGTGGTCTGTGTGAGGCTGTCTCTTC
AGTTCTTCTCCAGACTGTTCTTTGGTTGTCACTTAAAGTCAGAGGTCTGGTCCCTCATGTTTAGGTGAAAG
CCAGAGAATGACAGCTGTAGTCATATCTGAGCATAAGACCTTGATGTGTGATTCCTGATGACCGTTTCA
TTTATTATGTAATAAAGCAAAGGCCCTGGTCTTTTTAAACTACTAGTTTAAAAACCTGTGTTAAATG
AACAGTAATTTGCTGGTAGGTTGGTGTGTGTAGCATTGTGTGTCCATCTGTTATATGTAAGGACAA
GGCACCAGAACTCAGGCTTTTATTTCGATATTGAAGATGTTTAAACATCTTTCTTTTTCTTCTTCTCCT
TAGCCATCCCTCCCTTTTGTCTATCATTTCCCTAGAACAAGCCACCTGTCAATTGTGAAGGGTTGTGT
TCTTTATGGCAGGTTCTATGCAGATTGTGCCAGAGCATGTGCGTGTCTGTTGGCAAGCCACAGTGTCTC
CTTGACTGAAGACATTTCCAGGTAGATTTCTCAGCCAGCTCTAAACAGATTGCTTTTTTCAGTGGCCTTA
CTCTTTGTGGGTTTTTTTTTCTCTGAACTTGATATAAGATTTTTATTGTCCCTTGAAGAAAGTAACAA
ATGTGCATAGATCAATTTGTACTACTTTGGTCATTGGATATTTCTGATCCTTATTGCATTGTACCTAAAG
GAGAGTAACATAATGGTAACCTTTTTTAATAGAGTATGTGAAGGTAGTGGCTGATGAATCCTTAACGTTCA
TAGGGTCTTTTTGTCTGTTACGGTTGTATATAGAGGTCTGAAGGATTTTAAATGATTGTCACTTTTTCA

```

GCCCTCTTGTATTGTGTGCCCTCTCCGGCGCGCCGCGTTAGCGGCCGGGTGGAGGTGGGGAGGGAAGAC
 GCTGAGGAGGAGGAGGAGGCGGAGGAGGCGGTGGAGGGGAGGTGGGGGAATCAGCAAGGACATGGCTCC
 TGACTCCTGTGCCGAACGTGAGTGACTGAGCGGCAAAGCCCCGAATGGTCTCTAGCGACCCGCCGTGTCA
 CTGGAGGACGAGGTCTCCCATAGTATGAAGAGATGATTGGAGGCTGTTCGTTTGCTCAGACGAGAGAG
 GCTGGGCCGAGAACCCGCTGGTTATTGCGACGGGACGGCTGCAGCTCGCGGTGCATCAAGCTTGCTA
 TGGCATTGTTCAAGTACCCACTGGTACCGCTGGTTTTGCAGGAAATGGAATCTCAGGAGAGAGCAGCCAGA
 GTGAGATGTGAACCTTTGTCCCCATAAGGATGGAGCTTTAAAAAGAACAGATAATGGGGGTTGGGCCCATG
 TGGTTTGTGCCCTGTATATTCCAGAGGTACAATTTGCCAATGTTTCCACAATGGAACCAATTGTTTTACA
 GTCTGTTCCGCATGATCGTTATAATAAGACTTGTACATTTGTGATGAACAAGGAAGAGAAAGCAAAAGCA
 GCCACTGGTGCTTGCATGACATGTAATAAACATGGATGTCGACAGGCTTTCCATGTAGCATGCGCTCAGT
 TTGCCGGAGTGTCTTGTGAAGAAGAAGGTAATGGTGCCGATAATGTCCAATACTGTACCTACTGTAAATA
 CCATTTTAGTAAGCTGAAAAAGAGCAAACGGGGATCTAATAGGTCATATGATCAAAGTTTAAGTGATTCT
 TCCTCTCACTCTCAGGATAAACATCATGAGAAAGAGAAAAAAAATATAAAGAGAAGGACAAACACAAAC
 AGAAACACAAGAAGCAGCCAGAACCTCACCTGCGATTGGTTCCATCCTTGACTGTTACTACAGAAAAAAC
 TTATACAAGCACTAGCAACAACCTCTATATCTGGATCATTGAAGCGCTTGAAGATACTACTGCACGATTT
 ACAAAATGCAAAATTTCCAGGAAGTCTCTGCACACACCTCTAGTGGAAAAAGATGTTTCAGAGACTAGAGGGT

CAGAGGGCAAAGGGAAGAAATCTTCAGCTCACAGCTCAGGTCAAAGGGGAAGAAAGCCTGGTGGTGGAAAG
AAATCCAGGAACAACCTGTGTGTCAGCAGCTAGCCCTTTTCTCAAGGCAGTTTTTCAGGAACCTCAGGCAGT
GTAAAGTCATCTTCTGGAAGTTTCACTGTCAGTCTCCCCAGGATTTCTTGAGCTTTACAGACTCAGATCTGC
GTAATGACAGTTACTCTCACTCCCAACAGTCATCAGCAACCAAGATGTACATAAAGGAGAGTCTGGAAG
CCAGGAAGGGGGGTAAATAGTTTTAGTACCTTAATTGGCCCTCCCTTCAACCTCAGCTGTTACTTCACAG
CCTAAAAGCTTTGAAAATTCACCTGGAGATTTGGGTAATTCCAGCCTTCCTACAGCAGGATATAAGCGGG
CTCAAACCTCTGGGCATAGAAGAAGAACTGTAAAGGAAAAGAAAAGGAAAGGAAATAAACAAAGTAAGCA
TGGGCCCTGGCAGACCCAAAGGAAACAAAATCAAGAGAATGTTTCTCATCTCTCAGTTTCTTCTGCTTCA
CCAACATCATCTGTAGCATCAGCTGCAGGAAGCATAACAAGCTCTAGTCTGCAGAAATCTCCTACATTGC
TCAGGAATGGAAGTTTACAGAGCCTCAGTGTTGGCTCATCTCCAGTTGGTTTCAAGAAATTTCCATGCAGTA
TCGGCATGATGGAGCTTGCCCCAACAACTACGTTCTCAGAGTTGCTGAATGCAATACACAACGACAGAGGT
GACAGTTCTACACTAACAAAGCAAGAACTTAAATTCTAGGTATTTATAACAGCAATGATGTAGCAGTAT
CGTTTCCAAATGTAGTATCTGGCTCGGGATCTAGTACTCCTGTCTCCAGCTCTCACTTACCTCAGCAGTC
TTCTGGGCATTTGCAACAAGTAGGAGCGCTCTCTCCCTCAGCTGTGTCTCATCTGCAGCCCTGCTGTTGCT
ACAACTCAGGCCAAATACTCTATCTGATCTTCTCTCAGTCAGGCACCATCTCATATGTATGGCAATAGAT
CAAATTCATCAATGGCAGCTCTTATAGCTCAGTCTGAAAACAATCAAACAGATCAAGATCTTGGAGACAA
TAGCCGCAACCTAGTTGGCAGAGGAAGCTCACCCCGAGGAAGTCTCTCGCCACGATCCCCTGTAAGCAGC
TTACAGATTGCTATGATCAACCAGGCAACAGCAGTTTGGAAAATCTGCCCTCAGTAGCAGCCAGCATAG
AACAGCTTTGGAGAGGCAGTGGAGTGAAGGACAGCAATTTTACTAGAACAGGGTACTCCTAGTGCAT
TTTAGGAATGGAAGTCATTACACCAACTTCAAGTTGAAAACCGAAGATTAGAGGAACAAATTAAGAAC
TTGACTGCCAAAAGGAACGGCTTCAGTTATTGAATGCACAGCTTTCAGTGCCCTTTTCCAACAATAACAG
CAAATCCTAGTCCGTCTCATCAAATACACACATTTTACGACAGACTGCTCCTACTACTGATTCTTGAA
CAGCAGTAAGAGCCCTCATATAGGAAAACAGCTTTTACCTGATAATTCTCTTCTCTGATTAAATCAGGAC
TTAACTCCAGTGGACAAAGTACCAGCAGCTCATCAGCTCTTCTACCCACCTCCTGCTGGGCAGAGTC
CGGCTCAACAAGGCTCAGGAGTGAGTGGAGTTTCAAGAGTCAATGGCGTGACAGTGGGGGCACTAGCTAG
TGGAAATGCAGCCTGTAACCTTCCACCATTCTGCGGTGTCTGCAGTGGGTGGAATAATTGGAGCTTTGCCA
GGTAACCAACTGGCAATTAATGGCATGTAGGAGCTTTAAATGGGGTTATGCAGACTCCTGTCACAATGT
CCCAGAACCCTACCCCTCTCACCCACACAACCGTACCACCTAATGCAACACATCCAATGCCAGCTACACT
GACTAACAGCTACCTCAGGACTAGGATTAATTTCTGACCAGCAACGACAAATACTTATTCATCAACAGCAG
TTTACAGAGTTGTTAAATTTCTCAACAGCTCACACAGTACACAGGCACCCCACTTACACAGCAGTACCAC
CAACCCATTTCTCACCATCCATGGAGATAATGCAAGTCAGAAAGTAGCAAGACTTAGTGATAAACTGGG
CCTGTAGCTCAAGAGAAAAGTTGACACCTGAGAAACATCTAGAAATTGCCTATCCTGCTGTTCTAGCACT
TCATCTGGCTGCCTTTGCAAGTCTTTTACTACAGCTATGAAGAAACGCAACAAGAACTCAATGCACAAC
AAAGGATTAATTTGCAAGGACATCTTGTAAAGCTTTGATTAGTTTCTTGTGCTTTGTTGCTGAGTGA
AATGAATTECCATGCCCCTACCCCTTACCCAGTTTGTGAACATGGAAGAAAATTTAATAACTTTTT
AAAGTGACATAATTTACATGCAATATGTTTATCAACTCAAGAATTTAATATAGTTGGTACACAACCTAGTT
TTGTTTATAAATTTGAGATGCAAAATAGCAAACTAAATACTTGCTCCATTTACAACTACTTGATTTTAT
TGTACAAGTTGAAATATGCTCTTTGTTTGGGTTACAGTATGCTTGCTCTAAGTCAAATTTCAAGGAAC
AATTTCTTCTCCTGGAGTTGCATTGATTAGTATTACAAATATATAGCACATCACCTGGGAC

MLL2

SEQ ID NO:93

>gi|4505196|ref|NM_003482.1| Homo sapiens myeloid/lymphoid or mixed-
lineage leukemia 2 (MLL2), mRNA

ATGGACAGCCAGAACCTGGCTGGTGAGGATAAAGATTCAACAACCGGCAGCTGATGGACCTGCAGCCTCTG
AGGACCCAAGTGCCACTGAGTCAGACCTGCCAACCCACATGTGGGAGAGGTCTCTGTCCTTAGTTCTGG
GAGTCCCAGGCTTCAGGAGACTCCTCAGGACTGCAGTGGGGTCCGGTGCAGGCTTGTGCTCTCTGTAAC
TGCGGGGAGCCGCTCTACACGGGCAGCGGGAGCTACGGCGCTTTGAGTTGCCATTGATTGGCCCCGGT
GTCCAGTGGTGTCCCCTGGGGGGAGCCAGGGCCCAATGAGGCAGTGTGCCAGTGAGGACCTATCACA
GATTGGTTTCCCTGAGGGCCTTACACCTGCCACCTAGGAGAACCTGGAGGGTCTGCTGGGCTCACCAT
TGGTGTGCTGATGGTTCGGCAGGCGTATGGGGGAGGAGGCCCCACAATATGTGGTGTGGACAAGGCCA
TCTTCTCAGGATCTCACAGCGCTGCTCCCACTGCACCAGGCTCGGTGCCTCCATCCCTTGCCGCTCACC
TGGATGTCCACGGCTTTACCACCTCCCTGCGGAGTGCACGCGGTTCTTCTTATCCATGAAAACACTG
CAGCTGCTATGCCCAGAGCACAGTGGGGGGTGCATATCTGGAGGAGGCTCGCTGTGAGTGTGTGAGG
GGCCAGGGGAGCTGTGTGACCTGTTCTTCTGTACCAGCTGTGGGCATCACTATCACGGGGCCTGCCTGGA
CACTGCTCTGACTGCCCGCAACGTGCTGGCTGGCAGTGGCCCTGAATGCAAGTGTGCCAAGCCTGCAGG
AAACCTGGGAATGACTCTAAGATGTTGGTTTGCAGAGCTGTGACAAAGGATACCATCTTCTGCTTAA
AACCACCATGGAGGAACCTGCCTGCTCACTCTTGAAGTGAAGGCGTCCCGGTGTGCCGGGCTGTGG
GGCGGGCTCAGCAGAACTGAATCCCACTCGGAGTGGTTGAGAACTACTCTCTGTACCCGCTGTAC
AAGCCCAGGGAGGTGAGCTATCCGCTCCGTTGCTGAGCAGCATACCCGGTGTGTAGCAGATTTTAC
CCCAAGCCTGGCATTACCCCACTGACGAGCCGATGCTGTGTACGTTGCATGCCAAGGGCAGCCAA
GGGTGGGCAGTGACCTCTATGCAACCAAGGAACCGGCCCCCTGCAATGTGAAGCCAAACCACTAGGG

AAAGCAGGGGTCCAACTTGAGCCCCAGTTGGAGGCCCCCCCTAAACGAGGAGATGCCACTGCTGCCCCAC
 CTGAGGAGTCACCCCTGTCCCCACCACCTGAGGAATCACCACGTCCTCCACCACCTGAGGCATCACGCCT
 GTCGCCACCACCTGAGGAATTGCCCGCATCCCCACTTCTGAGGCATTGCACCTGTCCCGCGCGCTGGAG
 GAATCGCCCCCTCTCTCCGCGCCTGAGGAGTCTCTCTGTCTCCCCACCTGAATCATCACCTTTTCTC
 CACTGGAGGAGTCGCCCTTGTCTCCACCGAAGAGTCAACCCCATCTCTGCACTTGAGACGCCTCTATC
 CCCACCACCTGAAGCATCGCCCCGTGTCCCCACCATTGGAAGAATCTCCTTTGTCCCCGCCACCTGAGGAA
 TTGCCCACTTCCCCGCCACCTGAAGCATCTCGCTGTCTCCACCACCTGAGGAGTCACCCATGTCCCTC
 CACCTCAAGAGTCACGCATGTCTCCACCACCGGAGGCATCTCGTCTGTTCCACCATTGGAAGAGTCTCC
 TCTGTCCCCCTCCACCTGAGGAGTCTCCCCCTTTCCACCACCTGAGGCATCACGCCTGTCCCCACCACCT
 GAGGACTCGCCTATGTCCCCACCACCTGAAGAATCACCTATGTCCCCCCCCACCTGAGGTATCGCGCCTAT
 CCCCCCTGCTGTGGTGTACGCCTGTCTCCACCGCCTGAGGAATCTCCTTTGTCCCCACCGGCCCTGTCT
 TCCTTTGGGGGAGTTAGAGTACCCCTTTGGTGCCAAAGGGGACAGTGACCTGAGTCACCTTGGCTGCC
 CCACTTGGAGACACCCCATCAGCCCTCCACCAGAAGCTAACTGCACTGACCTGAGCCTGTCCCCCTA
 TGATCCTTCCCCCATCTCCAGGCTCCCCAGTGGGGCGGGCTTCTCCCATCTGATGGAGCCCCCTTCTCTC
 TCAGTGTTGCCCATCTTTCAGCATTCCTTGGTTCCCCAAACTCCCCCTCTTCCCAGTGTCTCTCTCT
 GCCCTACCACTGTCCGTTCCTTCCCCGTGAGTCCCATAGGGAAGGTAGTGGGGGTCTCAGATGAGGCTG
 AGCTGCACGAGATGGAGACTGAGAAAGTTTCAAGCTGAATGCCAGCCTTGGAACCCAGTGCACAG
 TCCTCTCCCTTCCCCAATGGGGGACCTTTCCTGCCCGCCCCAGCCCTGCCAGCCCTGGATGACTTC
 TCTGGCCTAGGGGAAGACACAGCCCTCTGGATGGGATGATGCTCCGGGTTACAGCCAGAGCCTGGAC
 AGACCCCTGGCAGTTTGGCTAGTGAACTTAAAGGCTCCCCGTGTCTCTGGACCCCGAGGAGCTGGCCCC
 TGTGACCCCTATGAGGCTTACCCCGAATGCAAGCAGACAGCAGGGCGGGGCTCACCATGTGAAGAACAG
 GAAGATCCACGTCACCGGTGGCCCCACACCACCACTCTCATCAATCCGACATCGTTAAGAGATCT
 CTAAGTCCAGCCAGGGTGAATGCCAGTGCCAGTTTCTGGCTCAGAGCCCTCCTGGGCTCTCCAGACCC
 GGAGGGGGGTGGCTCCCTGTCCATGGAGTTGGGGGTCTCTACGGATGTTAGTCCAGCCCGAGATGAGGGC
 TCCCTACGGCTCTGTACTGACTCACTGCCAGAGACTGATGACTCACTATTGTGCGATGTGGGACAGCTA
 TCAGCGGAGGCAAGCTGAGGGGGAGAAGGGGGCGGCGCAGCTCCCCAGCCCGTTCCCGCATCAAACA
 GGGTCGCAGCAGCTTCCCAGGAAGACCGCGGCTCTGTGGAGGAGCCCATGGAGGGGTGGTGAAGGA
 CGGCCCCGGCTAAAGTCAACTGCTTCTTCCATTGAGACTCTGCTGAGTGGTGTGACATTGATGACTCTCCA
 GTAAGGAGGAGGAGGAAGAAGATGATGACACCATGCAGAATACCGTGGTTCTCTTCTCCAACACAGACAA
 ATTTGTCTTAATGACAGGACATGTGTGTGGTATGTGGCAGCTTTGGCCGGGGGGGAGAGGGCCACCTCCTT
 GCCTGTTCCGAGTGCTCTCAGTGCTATCACCCCTTACTGTGTCAACAGCAAGATCACCAAGGTGATGCTGC
 TCAAGGGCTGGCGTTGTGTGGAGTGTATTGTGTGTGAGGTGTGTGGCCAGGCCCTCCGACCCCTCACGCCT
 GCTGCTGTGTGATGACTGTGATATTAGCTACCACACATACTGCTGGACCCCCCACTGCTCACCGTCCCC
 AAGGGCGGCTGGAAGTCAAGTGGTGTGTCTGTATGCACTGTGGGGCTGCTTCCCCTGCTTCCACT
 GTGAATGGCAGAAATAGTTACACACACTGTGGCCCTGTGCCAGCCTGGTGACCTGCCCTATCTGTATGC
 TCCTTACGTAGAGAGGACCTACTAATCCAGTGCCGCCACTGTGAACGGTGGATGCTATGCAGGCTGTGAG
 AGCCTCTTCAAGAGGACATGTGGACACAGCAGCCGATGAAGGCTTTGACTGTGTCTCTGCCAGCCCT
 ACGTGGTAAAGCCTGTGGCGCCTGTTGCACCTCCAGAGCTGGTGCCCATGAAGGTGAAAGAGCCAGAGCC
 CCAGTACTTTTCGCTTCGAAGGCGTGTGGCTGACAGAACTGGCATGGCCTTGTGCGTAACCTGACCATG
 TCACCACTGCACAGCGGCGCAACCGCGAGGACGGCTTGGCCTCCAGGCGAGGCAGGATTGGAGGGTT
 CTGAGCCCTCAGATGCCCTTGGCCCTGATGACAAGAAGGATGGGGACCTGGACACCGATGAGCTGCTCAA
 GGGTGAAGGTGTGGAGCAGATGGAGTGGAAATTAACTGGAGGGCCCCGTCAGCCCTGATGTGGAG
 CCTGGCAAAGAGGAGACCGAGGAAAGCAAAAACGCAAGCGTAAACCATATCGGCCTGGCATTGGTGGTT
 TCATGGTGCACAGCGGAAATCCACACACGACGCAAAAAGGGGCTGCTGCACAGGCGAGGTGTGGAG
 TGGGGATGGGCAGCCCGACGAGGTGATACCTGTGACCTGCTGACAGAGGGCGCCGTGGAGCAGAGCTTA
 GCTGAAGGGGTGAGAAGAAGAAGCAACAGCGGCGAGGGCGCAAGAGGAGCAAACTGGAGGGCATCTTCC
 CTGCTTACTTGCAGGAACCTTCTTTGGGAAGGAGCTGCTGGACCTGAGCCGTAAGGCCCTTTTGTGAGT
 TGGGGTGGGCGGCAAGCTTTGGACTAGGGACCCCAAAGCCAAGGGAGATGGAGGCTCAGAAAGGAAG
 GAATCCCCACATCGCAGAAAGGAGATGATGGTCCAGATATTGCAGATGAAGAATCCCGTGGCCTCGAGG
 GCAAAGCCGATACACAGGACCTGAGGATGGGGCGTGAAGGCATCCCCAGTGCCCACTGACCTTGAGAA
 GCCAGGCACCCAGGTGAAGGGATGCTTAGCTCTGACTTAGACAGGATTTCCACAGAAGAACTGCCCAAG
 ATGGAATCCAAGGACCTGCAGCAGCTCTTCAAGGATGTTCTGGGCTCTGAACGAGAACAGCATCTGGGTT
 GTGGAACCCCTGGCCTAGAAGGCAGCCGTACGCCACTGCAGAGGCCCTTTCTTCAAGGTGGACTCCCTTT
 GGGCAATCTGCCCTCCAGCAGCCCAATGGACTCCTACCCAGGCCCTGCGCAGTCCCCGTCTCTGGATTCT
 AGGGAGCGCGGGGGCTTCTTTAGCCCGGAACCCGGTGAGCCCGACAGCCCTGGACGGGCTCAGGTGGGA
 CCACGCCCTCCACCCCAACACCCCAACACGAGGGGTGAGGGCGACGACTCTCTATAACCAAGCGGAG
 TCTTCAAGCCTGGGAGGAAGGATGAGGAGTTGGGCCAGCTGTCCACCATCTCGCTGTGCTATGCAAC
 ATTAATTTTCTTAATCTAAGCAAGACTACCCAGACTGGTCAAGCCGTTGCAACAAATCATGAAGCTCT
 GGAGAAGGTTCCAGCAGCTGACAAAGCCCCCTACCTGCAAAAGGCCAAAGATAACCGGGCAGCTCACCG
 CATCAACAAGGTGCAGAAGCAGGCTGAGAGCCAGATCAACAAGCAGACCAAGGTGGGCGACATAGCCCGT
 AAGACTGACCCGACCGGCCCTACATCTCCGCATTCCCCCGCAGCCAGGGGCACTGGGCGAGCCCGCCCGG
 CTGCTGCCCCCAACATTTTCAATTGGCAGCCCACTACCCCGCGGCTTGTCTACCTCTGCGGACGGGTT
 CCTGAAGCCGCGCGGCTCGGTGCCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
 CAGGTGCCCGCCCAAGCGCCTTCGACAGGACCCCTTTGGACTGGGCCCTGCTATCCCCCTGGAGCCCGCT
 TCCCCACGGCACCGCCCACTATCCCCCTATCCTAGTCTTACGGGGGCCCCCTGCGCAGCCCCCGATGCT
 GGGCGCCTCATCTCGTCTGGGGGTGGCCAGCCAGGGGAATTCCACACTACCCACCTGGCACCCCCAGA

CACCAGCCCTCCACACCTGACCCGTTCCCTCAAACCCCGCTGCCCTCGCTGGATAACTTGGCTGTGCCTG
 AGAGCCCTGGGGTAGGGGAGGCAAAGCTTCCGAGCCCTGCTCTCGCCCCACCTTTTGGGGAGTCCCG
 GAAGGCCCTAGAGGTGAAGAAGGAAGAGCTTGGGGCATCCTCTCCTAGCTATGGGGCCCCAAACCTGGGC
 TTGTGTGACTACCCCTCCTCAGGCACCCACCTGGGTGGCTGGAGTTAAAGACACCTGATGTCTTCAAAG
 CCCCCGTGACCCCTCGGGCATCTCAGGTAGAGCCCCAGAGCCCGGCTTGGGCCTAAGGCCCCAGGAGCC
 ACCCCCTGCCAGGCTTGGCACCTTCTCCTCCAAGTACCCAGACATCTTTCGCCCTGGCTCCTACACT
 GACCCATATGCTCAGCCCCATTGACTCCTCGGCCCAACCTCCGCCCTGAGAGCTGCTGTGCTCTGC
 CCCCTCGCTCACTGCCCTCCGACCCTTTCTCCGAGTGCCTGTGAGTCTCAGTCCCAGTCCAGCTCCCA
 GTCTCCACTGACACCCCGGCTCTGTCTGCTGAAGCTTTTGGCCATCACCCGTTACCCCTCGCTTCCAG
 TCCCCTGACCTTATTCTCGCCACCCCTCAGCCCTCAGTCCCCTGACCCATTGGCCCAATTGCAATAAGC
 CACCCCGACCCAGCCCTGAAGTTGCCCTTAAAGGCTGGGTCTCTAGCCCACTTCCGTGGGGGCTGG
 GGGGTTCCAGCAGCCCTGCCCGCGGGGCCAGAGGTGAGTCCATGCCAAGGTCCCAAGTGGGCAGCCC
 CCCAATTTGTCCGGTCCCCTGGGACGGGTGCATTGTGGGCACCCCTCTCCATGCGTTTCACTTTCC
 CTCAGGCAGTAGGGGAGCCTTCCCTAAAGCCCTGTCCCTCAGCCTGGTCTCCCGCCACCCCATGGGAT
 CAACAGCCATTTTGGGCCCGGCCCCACCTTGGGCCAAGCCTCAAAGCACAACTACACAGTAGCCACAGGG
 AACTTCCACCCATCGGGCAGCCCTTGGGGCCAGCAGCGGTCCACAGGGGAGAGCTATGGGCTGTCCC
 CACTACGCCCTCCGTCCGTTCTGCCACCACCTGCACCCGACGGATCCCTCCCTACCTGTCCCATGGAGC
 CTCACAGCGATCAGGCATCACCTCTCCTGTGAAAAGCGAGAAGACCCAGGGACTGGAATGGGTAGCTCT
 TTGGCGACAGCTGAATCCCAGGTACCCAGGACCCAGGCATGTCCGGCTTAGCCAAACAGAGCTGGAGA
 AGCAACGGCAGCGCCAGCGGTACGAGAGCTGTCTGATTCCGGCAGCAGATCCAGCGCAACACCCCTGCGCA
 GGAGAAGGAAACAGCTGCAGCAGCTGCGGGAGCAGTGGGGCTCCAGGCAGCTGGGGTGTCTGAGCCAGC
 AGCCCTGCCCTTTGAGCAGCTGAGTCGAGGCCAGACCCCTTTGCTGGGACACAGGACAAGAGCAGCCTTG
 TGGGGTTGCCCCCAAGCAAGCTGAGTGGCCCCATCCTGGGGCCAGGGTCTTCCCTAGCGATGACCGACT
 CTCCCGGGGCACTCCAGCAGCCCTTCCCTATGAGTGTGAACAGCCGGCAACTGGTAGGAGGCTCC
 CAAGCTTTCTATCAGCGAGCACCTTATCCTGGGTCCCTGCCCTTACAGCAGCAACAGCAACAACTGTGGC
 AGCAACAACAGGCAACAGCAGCAACCTCCATGCGATTTGGCATGTGAGCTCGCTTTCCATCAACTCCTGG
 ACCTGAACCTTGGCCGCCAAGCCCTAGGTTCCCGGTTGGCGGGAATTTCCACCCGCTGTCAGGCCCCCTGGT
 GAGCCAGTGCCTGGTCCAGCTGGTCTGCCAGTTTATTGAGCTGCGGCACAATGTACAGAAAGGACTGG
 GACCTGGGGGCACTCCGTTTCTGGTTCAGGGCCACCTCAGAGACCCGTTTACCCTGTAGTGAAGGA
 CCCCCACCGACTGGCTCCTGAAGGGCTTCGGGGCCTGGCGGTATCAGGTCTTCCCCACAGAAACCTCA
 GCCCCACCGGCCCTGAATTGAACAACAGTCTTCATCCAACACCCACACCAAGGGTCTTACCCTGCCAA
 CTGGTTTGGAGCTGGTCAACCGGCCCCCGTCGAGGACTGAGCTTGGCCGCCCAATCCTCTGGCCCTGGA
 AGCTGGGAAGTTGCCCTGTGAGGATCCCGAGCTGGATGACGATTTTGATGCCCAAGGCCCTAGAGGAT
 GATGAAGAGCTGACCTGAGTCTGGGTGTGGATGGGCAAGGGTGATGATGAACCTGGCCTTAG
 AAAACCTGGAGACCAATGACCCCACTTGGATGACCTGCTCAATGGAGACGAGTTTGACCTGCTGGCATA
 TACTGATCCTGAGCTGGACACTGGGGACAGAAGGATATCTTCAATGAGCACCTGAGGCTGGTAGAATCG
 GCTAATGAGGAGGCTGAACGGGAGGCCCTGCTGCGGGGGGTGGAGCCAGGACCTTGGGCCCTGAGGAGC
 GCCCTCCCTGCTGCTGATGCCCTCTGAACCCCGCTGGCATCTGTGCTCCCTGAGGTGAAGCCCAAGGT
 GGAGGAGGTGGACGCCACCTTCTCCTTGGCAATTCCCAATTGCTACCCCAAGGTAGAGCCCGCACCT
 GCTGCCAATTCCTTGGCCTGGGGCTAAAGCCAGGACAGAGCATGATGGGCAGCCGGGATACCCGGATGG
 GCACAGGGCCATTTTCTAGCAGTGGGCACACAGCTGAGAAGGCCTCCTTTGGGGCCACGGGAGGGCCACC
 AGCTCACTGCTGACCCCAAGCCCACTGAGTGGCCAGGAGGATCCTCCCTGCTGGAAAAGTTTGGAGCTC
 GAGAGTGGGGCTTTGACCTTGCCTGGTGGACCTGCAGCATCTGGGGATGAGCTAGACAAGATGGAGAGCT
 CACTGTTAGCTGGGACGCACTTACCCCTGCTCATTGAGGACCTGTTGGAGCATGAGAAGAAGGAGCTGCAGAA
 GAAGCAGCAGCTTTTCAACAGATTGCAGCCTGCCAGCAGCAGCAGCAACAGCAGCAGCAGCATTCCCTA
 CTGCCTGCACAGGCCCTGCCAGGCCATGTCTTTGCCACATGAGGGCTCTTCTCCAGTTTGGCTGGGT
 CCCAACAGCAGCTTTCCTGGGTCTTGCACTTGGCCAGCAGCCAGGTTTGGCCAGCCACTGATGCCAC
 CCAGCCACCAGCTCATGCCCTCCAGCAACGCTGGCTCCATCCATGGCTATGGTGTCCAATCAAGGGCAT
 ATGCTAAGTGGGCAGCATGGAGGGCAGGACGGCTGGTACCCAGCAGAGCTCACAGCCAGTGTATCAC
 AGAAGCCCATGGGCACCATGCCACCTTCCATGTGCATGAAGCCGAGCAATTGGCAATGCAGCAGCAGCT
 GGCAACAGCTTCTTCCAGATACAGACCTGGACAAATTTGCTGCAGAAGATATCATTGGTCCCATTGCA
 AAGGCCAAGATGGTGGCTTTGAAGGCAATCAAGAAAGTGATGGCTCAGGGCAGCATTGGGGTGGCACCTG
 GTATGAACAGACAGCAAGTGTCTCTGCTAGCCAGAGGCTCTCGGGGGACCTAGCAGTGATCTGCAGAA
 CCATGTGGCAGCTGGGAGTGGCCAGGAGCGGAGTGTGGTATCCCTCCAGCCTCGTCCCAACCCGCC
 ACTTTTGTCTCAGGGAGTGATCAATGAAGCTGACCAGCGGCAGTATGAGGAGTGGCTGTTCATACCCAGC
 AGCTCCTACAGATGCAGCTGAAGGTGCTAGAGGAGCAGATTGGTGTACACCGCAAGTCCCGAAGGCTCT
 GTGTGCCAAGCAGCGCACTGCCAAAAAGCTGGCCGTGAGTTCCAGAAAGCTGATGCTGAGAAGCTCAAG
 CTGGTTACAGAGCAGACAGCAAGATCCAGAAACAACTGGATCAGGTCCGGAACAGCAGAGGAGCACA
 CTAATCTCATGGCAGAATATCGGAACAAAGCAGCAGCAACAAAGCAGCAGCAGCAACAAAGCAGCA
 GCACTCAGCTGTGCTGGCTCTCAGCCCTTCCAGAGTCCCGGCTGCTCACCAAGCTCCCTGGTCAAGTG
 CTCCCTGGCCATGGGCTGCAGCCACCACAGGGCCCTCCGGTGGGCAAGCCGAGGTCTTCCCTGACCC
 CTGGGGGTATGGCACTACCTGGACAGCCTGGTGGCCCTTCTTAATACAGCTCTGGCCCAACAGCAGCA
 ACAGCAACATTCTGGTGGGGCTGGATCCCTGGCTGGCCCTTTCAGGGGGCTTCTTCCCTGGCAACCTTGCT
 CTTCCGAAGCCTCGGACCTGATTCAAGGCTTTTACAGGAAGGCAGCTGCAGCTGCAGCAGCAACGATGC
 AGCTGGCCCAAGAACTGCAGCAGCAGCAGCAGCAGCAACAGCAGCAGCAGCAGCCTTCTAGGACAGGTGGC
 AATCCAGCAGCAACAGCAGCAGGCTCCTGGAGTACAGACAAACCAAGCTCTGGGTCCCAAGCCCCAGGGC

CTTATGCTCCAGCAGCCACCAAGGCCTCTGGTCCAGCAGCTGTCCCCTCAACCACCCAGGGGCCCC
 AGGGCATGCTGGGCCCTGCCAGGTGGCTGTGTTGCAGCAGCAGCACCCTGGAGCTTTGGGCCCCAGGG
 CCCTCACAGACAGGTGCTTATGACCCAGTCCCAGGTGCTCAGTTCCCCCAGCTGGCAGCAGGGTCAG
 GGCTTTATGGGACACAGGCTGGTCACAGCCAGCAGCAGCAGCAACAACAGCACCAACAGCAAGGGT
 CCATGGCAGGGCTGTCCCATCTTCAGCAAAGTCTGATGTCACACAGTGGGCAGCCAACTGAGCGCTCA
 GCCCATGGGCTCTTTACAGCAGCTTCAGCAGCAGCAGCAGCTGCAACAGCAACAGCAACTTCAGCAGCAG
 CAGCAGCAGCAGCTACAACAGCAACAGCAACTTCAGCAGCAACAGCTTCAACAGCAGCAACAGCAGCAGC
 AGCTTCAACAACAGCAGCAGCAACAGCTTCAACAGCAGCAACAGCAGCTACAACAGCAACAGCAACA
 ACAGCAGCAGTTTCAACAGCAGCAGCAACAGCAGCAGATGGGCCTTTTAAACCAGAGTCAACTTTACTG
 TCCCCTCAGCAACAACAGCAGCAGCAAGTGGCACTTGGCCCTGGCATGCCAGCAAGCCTCTTCAACACT
 TTTCTAGCCCTGGAGCCCTGGGTCCAACCTCTCTGACGGGCAAGGAACAAAACACCGTAGACCCAGC
 CGTTTCTCAGAGCCACTGAGGGCCCTCTACACATCAGGAGGGCCGTAGCAATAGGAAGTACCTCT
 GAGTCAATGGCCACTGAACAGGAGAGGTAAAGCCCTCACTCTCTGGGACTCAAACTCTGCTTGTTC
 AACCCAGCCCCAGCCTCAGCCAGCTCTCTGCAGCTGCAGCCACCTCTGAGGCTTCAGGACAACAGCA
 GCAGCAAGTTAGCCTGCTCCACACAGCAGGTGGAGGAAGCCATGGGCAGCTAGGCAGTGGATCATCTTCT
 GAGGCCTCATCTGTGCCCCACCTGCTGGCTCAGCCCTCTGTTTCTTAGGGGATCAGCCTGGGTCCATGA
 CCCAGAACTTCTGGGCCCCCAACAGCCCATGCTAGAGCGGCCCATGCAAAATAATACAGGGCCACAACC
 TCCCAAAACCAGGACTGTCTCCAGTCTGGGCAGGGTCTGCTGGGGTTGGAATCATGCCCTACGGTGGGT
 CAGCTTCGAGCAGCAGCTCCAAGGAGTCTGGCCAAAAACCCACAGCTGCGGCACCTTAAGTCTCAGCAGC
 AGCAGCAGCTACAGGCACCTCCTCATGCAGCGGCAGCTGCAGCAGAGTCAGGCAGTACGCCAGACCCACC
 CTACAGGAGCCTGGGACCCAGACCTCTCCCCTCAGGGCCTCTGGGCTGCCAACCTCAACTTGGGGGC
 TTCCCTGAGCAGCAGGCCCCCTCCAGGAGTGGGGCCTCGACCTCAGGGCCCCACCTCCGCG
 TCCCTGCCCCACCAGGAGCCTTATCTACAGGACAGTCTTGGCCCTGTCCATCCACACCTCCACCATC
 CAGCCCTCAAGAGCCAAAGAGACCTTCACAATTACCTTCCCCCAGCTCCCAGCTTCCCACTGAGGCCAG
 CTCCCTCCCACCCATCCAGGGACCCCAACCTCAGGGGCCAACCTTGGAGCCGCTCTCTGGGAGGGTCT
 GACCTGCTGCTGCCAGCTTGCGAGTACCTTGTTTAGCAAGGGTCTGGGACCTTGGGATCCCCAGACAA
 CCTAGCAGAAACCCAGAGCCAGAGCAGCAGCAGCTGTACTGGGCATCTGGACCAGGTGAATGGACAG
 GTGGTGCTGAGGCATCCCAACTCAGCATCAAGCAGGAACCTCGGGAAGAGCCATGTGCCCTGGGAGCCC
 AGTCAGTGAAGAGGGAGGCCAATGGGAGCCAATAGGGGACCAGGAACCAGCAACCACCTCTGCTGGC
 AGGCCCTCGCTCAGAAGCTGGGCATCTGCTCTTGCGAGAGCTACTCCGGGCAAGAATGTGCAACTCAGC
 ACTGGGCAGGGGTCGAGGGGCTGCGAGCTGAGATCAACGGGCACATTGACAGCAAGCTGGCTGGGCTG
 AGCAGAAACTCAGGGTACCCCGACCAACAGGAGGATGGCAGCAGCAAGGAAGCCTTTGACACCGAAGCC
 CAAGCGGGTACAGAAGGCAAGCGACAGGTTGGTGAGCTCCCGAAAGAAGCTGCGGAAGGAGGACGGCGTC
 AGGGCCAGCGAGGCTTGTGAAACAGCTGAACAGGAGCTGTCCCTGCTGCCCTAACGGAGCCTGCTA
 TCACCGCAATTTTAGCCTCTTTGCCCTTTGGCAGTGGCTGCCAGTCAATGGGCAGAGCCAGCTGAG
 GGGGCTTTGGAAGTGGGGCGCTGCCACTGGCCCTGACTACTATTTCCAGCTGCTTACCAAGAATAAC
 CTGAGTAACCCGCGACACCACTCGTCTGCTGCCCTCCACCCACCCCATCGGTGCGAGCAGAAGATGG
 TGAATGGCGTACCCCATCTGAAGAGCTGGGGGAGCACCCCAAGGATGCTGCCTCTGCCCGGGATAGTGA
 AAGGGCACTGAGGGATACCTCAGAGGTGAAGAGTCTAGACCTGCTGGCTGCCTTGCCCTACACCCCTCAC
 AATCAGACTGAGGATGTCAGGATGGAGAGTGTAGGATAGCGATTCTCTGACAGCATTGTGCCAGCTT
 CATCCCTGAGAGCATCTGGGGGAGGAGGCCCTCGTTTCCCTCATCTGGGCTCAGGCCGGTGGGAGCA
 AGAGGACCGGGCCCTCTCCCTGTCTATCCCCCTCATCTCTCGGGACAGCATCCAGTCTTCCAGATACC
 AAACCTTATGGGGCCCTTGGCCTGGAGGTCCCTGGAAAGCTGCCTGTCACAACTTGGGAAAAGGGCAAAG
 GAGTGAGGTGTGAGTCACTGCTCAGAGTCTCTGCTGCTGCAGACAAGAACCTGAATGGCGTGATGTTGCG
 AGTGGCGGAGCTGCTGAGCATGAAGATCCCCAATCCTATGAGGTGCTGTTCCAGAGAGCCCCGCCCGG
 GGAGGCATGAGCTGAGCAAGAGGGGAGCTGAGGTCCTGGTGGGAAGGAAAAGGGTCTGGAAGGCAAGA
 GCCAGACACTGGCCCTGATTGGCTGAAGCAGTTTGTATGCAAGTGTGGCTGGCTATACCTGAGAGGCA
 ACTAGACATCTTGAGCCTCTGAAACAGGAGAGCCCCGCCAGAGCCACCCACTCAGCAGAGGTATACC
 TACAATGTCTCAATCTGGATGTGCGACAGCTCTCGGCCCEACCTCCTGAAGAACCTTCCCGCCCCCTT
 CCCCCTTGGCACCTTCTCCTGCCAGTCCCCCTACTGAGCCCTTGGTTGAACCTTCCACCGAACCTTGGC
 TGAGCCACCCGCTCCCCTCACCTCTGCCACTGGCCCTCATCCCCTGAATCAGCCCGACCCAGCCCCGTCGC
 CGGCCCTTGAAGAAGGTGAAGATAACCGTCTCTCTCGCCTCAAGAAATGGAAAGGAGTGGCGTGAAGC
 GGCTTTCGGCTGCTGCTGACCATCCAGAAGGGCAGTGGACGGCAGGAGGATGAGCGGGAAGTGGCAGAGTT
 TATGGAGCAGCTTGGCACAGCCTTGCAGACCTGACAGGTACCGCGAGACATGCGTGGCTGCTGTTTCTGT
 CATGAGGAGGGTGACGGGGCCACTGATGGGCCTGCCGTCTGCTGAACCTGGACCTGGACCTGTGGGTGC
 ACCTCAACTGTGCCCTTGGTCCACGGAGGTGTATGAGACCCAGGGCGGAGCACTGATGAATGTGGAGGT
 TGCCCTGACCGGAGCTGCTAACAAGTGTCTCTGCTGCTGCGAGCAACTGGTGCCACAGCAGCTGCAAT
 CGCATGCGTTGCCCAATGTCTACCATTTTGGTTGTGCCATCCGCGCCAAGTGCATGTTCTTCAAGGACA
 AGACCATGCTGTGTCATATGATCAAGATCAAGGGGCCCTGTGAGCAAGAGCTGAGCTCTTTTGTGTCTT
 CCGGCGGGTCTACATTGAGCGGGACGAGGTGAAGCAAATCGCTAGCATCATTCAGCGGGGAGAACGGCTG
 CACATGTTCCGTGTGGGGGGGCTTGTGTTCCACGCCATCGGACAGCTGCTGCCTCACCAGATGGCTGACT
 TTCATAGTGCCACTGCCCTCTATCCCGTGGGCTACGAGGCCACGCGCATCTATTGGAGCCTCCGACCAA
 CAATCGTCTGCTGCTATCGCTGTTCTATTGGTGAGAACAACGGGCGGCCGGAGTTTGTAAATCAAAGTC
 ATCGAGCAGGGCCTGGAGGACCTGGTCTTCACTGACGCTCTCCCCAGGCCGTGTGGAATCGCATATTG
 AGCCTGTGGCTGCCATGAGAAAAGAGGCTGACATGCTGCGACTTCTCCCTGAGTATCTGAAGGCGGAGGA
 GCTCTTTGGGCTGACGGTGCATGCCGTGCTTCGCATAGCTGAATCACTGCCCGGGGTGGAGAGCTGTCAA

AACTATTTATTCCGCTATGGGCGCCACCCCTTATGGAGCTGCCACTCATGATCAACCCCACTGGCTGTG
 CCGGATCAGAGCCTAAATCCTCACACACTACAAACGGCCCCATACCTGAACAGCACCAGCATGTCTAA
 GGCATATCAGAGCACCTTCACAGGCGAGACCAACACCCCTACAGCAAGCAGTTTGTGCACTCCAAGTCA
 TCTCAGTACCGCGGGCTGCGCACCGAATGGAAGAACAACGTGTACCTGGCTCGCTCCCGTATCCAGGGCC
 TGGGGCTCTATGCAGCCAAAGACCTAGAAAAGCACACAATGGTTATCGAGTACATTGGCACCATCATTCCG
 GAACGAGGTGGCCAACCGGCGGGAGAAAATCTACGAAGAGCAGAATCGAGGCATCTACATGTTCCGAATA
 AACAAATGAACATGTGATGATGCTACGTTGACCGCGGGCCCTGCCAGGTACATTAACCATTCTGTGCCC
 CTAAGTGTGGCCGAAGTCGTGACATTTGACAAAGAGGACAAAATCATCATCTCCAGCCGCGGAAT
 CCCCAGGAGAGGAGCTAACCTATGACTATCAGTTTGATTTTGAGGACGATCAGCACGAGATCCCTGTC

Table 4 Histone Deacetylases

HDAC1

SEQ ID NO:94

>gi|13128859|ref|NM_004964.2| Homo sapiens histone deacetylase 1 (HDAC1), mRNA

GAGCGGAGCCGCGGGCGGGAGGGCGGACGCGGACTGACGGTAGGGACGGGAGGCGAGCAAGATGGCGC
 AGACGCGAGGGCACCCGGAGGAAAGTCTGTTACTACTACGACGGGGATGTTGGAAATTACTATTATGGACA
 AGGCCACCCAATGAAGCCTCACCGAATCCGCATGACTCATAATTTGCTGCTCAACTATGGTCTCTACCGA
 AAAATGGAAATCTATCGCCCTCACAAAGCCAATGCTGAGGAGATGACCAAGTACCACAGCGATGACTACA
 TTAATTTCTTGGCTCCATCCGTCAGATAACATGTGCGGAGTACAGCAAGCAGATGCAGAGATTCAACGT
 TGGTGAGGACTGTCCAGTATTCGATGGCCTGTTTGAAGTTCTGTCAAGTTGTCTACTGGTGGTTCTGTGGCA
 AGTGCTGTGAAACTTAATAAGCAGCAGACGACATCGCTGTGAATGGGGCTGGGGGCCTGCACCATGCAA
 AGAAGTCCGAGGCATCTGGCTTCTGTTACGTCAATGATATCGTCTTGGCCATCCTGGAACCTGCTAAAGTA
 TCACCAGAGGGTGTGTACATTGACATTGATATTACCATGGTGACGGCGTGGAAGAGGCCTTCTACACC
 ACGGACCGGGTCATGACTGTGTCTTTTCAAGTATGGAGAGTACTTCCAGGAACCTGGGGACCTACGGG
 ATATCGGGGCTGGCAAAGGCAAGTATTATGCTGTTAACTACCCGCTCCGAGACGGGATTGATGACGAGTC
 CTATGAGGCCATTTCAAGCCGGTCATGTCCAAAGTAATGGAGATGTTCCAGCCTAGTCCGCTGGTCTTA
 CAGTGTGGCTCAGACTCCCTATCTGGGGATCGGTAGGTTGCTTCAATCTAACTATCAAAGGACACGCCA
 AGTGTGTGGAATTTGTCAAGAGCTTTAACTGCTATGCTGATGCTGGGAGGCGGTGGTTACACCATTCG
 TAACGTTGCCCGGTGCTGGACATATGAGACAGCTGTGGCCCTGGATACGGAGATCCCTAATGAGCTTCCA
 TACAATGACTACTTTGAATACTTTGGACCAGATTTCAAGCTCCACATCAGTCTTCCAATATGACTAACC
 AGAACACGAATGAGTACCTGGAGAAGATCAAACAGCGACTGTTGAGAACCTTAGAATGCTGCCGCACGC
 ACCTGGGGTCCAAATGCAGGCGATTCTCTGAGGACGCCATCCCTGAGGAGAGTGGCGATGAGGACGAAGAC
 GACCCTGACAAGCGCATCTCGATCTGCTCTGACAAACGAATGCTGTGAGGAAGAGTTCTCCGATT
 CTGAAGAGGAGGGAGAGGGGGGCCCAAGAACTCTTCCAACCTCAAAAAAGCCAAGAGAGTCAAAAACAGA
 GGATGAAAAAGAGAAAGACCCAGAGGAGAAGAAAGAGTCACCGAAGAGGAGAAAACCAAGGAGGAGAAG
 CCAGAAGCCAAAGGGGTCAAGGAGGAGGTCAAGTTGGCCTGAATGGACCTCTCCAGCTCTGGCTTCTGCTG
 TGAGTCCCTCACGTTTCTTCCCAACCCCTCAGATTTTATATTTCTATTCTCTGTGATTTATATAAA
 AATTTATTAATATATCCCAAGGAGACAAAACCAAGGCCCGAGCTCAGGGCAGCTGTGGTGGTG
 AGCTCTTCCAGGAGCCACCTTGCCACCCATTCTTCCCGTTCTTAACCTTTGAACCATAAAGGGTGCCAGGT
 CTGGGTGAAAGGGATACTTTTATGCAACCATAAGACAACTCCTGAAATGCCAAGTGCTGCTTAGTAGC
 TTTGGAAAGGTGCCCTTATTGAACATCTAGAAGGGGTGGCTGGGTCTTCAAGGATCTCCTGTTTTTTTC
 AGGCTCCTAAAGTAACATCAGCCATTTTAGATTTGGTTCTGTTTTCGTACCTTCCCACTGGCCTCAAGTG
 AGCCAAAGAAACACTGCTGCTGCTCTTCTCCTAATTTCTGCAGGTGGAGGTTGCTAGTCTAGTT
 TCCTTTTGGAGATACTATTTTCATTTTGTGAGCCTCTTTGTAATAAAATGGTACATTTCT

HDAC2

SEQ ID NO:95

>gi|4557640|ref|NM_001527.1| Homo sapiens histone deacetylase 2 (HDAC2), mRNA
 CGCGAGCTTTTCGGCACCTCTGCGGGTGGTACCGAGCCTTCCCGGCGCCCCCTCTCTCTCCACCGG
 CCGCCCTTCCCGCGGGACTATCGCCCCACGTTTCCCTCAGCCCTTTCTCTCCCGCGAGCCGCGG
 CGGCAGCAGCAGCAGCAGCAGCAGGAGGAGGAGCCCGGTGGCGGCGGTGGCCGGGAGCCCATGGCG
 TACAGTCAAGGAGGCGGCAAAAAAAGTCTGCTACTACTACGACGGTGATATTGGAATATTATTATG
 GACAGGGTCATCCCATGAAGCCTCATAGAATCCGCATGACCATAACTTGCTGTAAATATGGCTTATA
 CAGAAAAATGGAAATATATAGGCCCATAAAGCCACTGCCGAAGAAATGACAAAATATCAGTGATGAG
 TATATCAAATTTCTACGGTCAATAAGACAGATAACATGTCTGAGTATAGTAAGCAGATGCATATATTA

114

115

CTACGGCTGTGGCCGCTCTGTGAACCATAGCGGTGTGCGGCGGGGGTCTGCACCCGGGTGGGGGACA
GAGGGACCTTTAAAGAAAACAAACCTGGACAGAAACAGGAATGTGAGCTGGGGGAGCTGGCTTGAGTTTC
TCAAAGCCATCGGAAGATGCGAGTTTGTGCTTTTATTTTATGCTCTGGTGGATTTTTGTGGGT
TTTCTGAAGTCTGAGGAACAATGCCCTTAAGAAAAACAAACAGCAGGAATCGGTGGGACAGTTTCTGTG
GCCAGCCGAGCCTGGCAGTGTGGCACCAGCGAGCTGGCCTGACGCCTCAAGCACGGGCACCGCCGTCAT
CTCCGGGGCCAGGGGCTGCAGCCCGGGCTCCCTGTTTTGCTTTATGCTGTTTAAAGAAAAATGGAGGTA
GTTCCAAAAAGTGGCAAAATCCCGTTGGAGGTTTTGAAGTCCAACAAATTTAAACGAATCCAAAGTGT
CTCACACGTCACATACGATTGAGCATCTCCATCTGGTCGTGAAGCATGTGGTAGGCACACTTGCAGTGT
ACGATCGGAATGCTTTTATTAAAGCAAGTAGCATGAAGTATTGCTTAAATTTTAGGTATAAATA
TATATATGTATAATATATATTCCAATGTATTCCAAGCTAAGAACTTACTTGATTCTTATGAAATCTTGA
TAAATATTTTATAATGCATTTATAGAAAAAGTATATATATATATAAATGAATGCAGATTGCGAAGGT
CCCTGCAAAATGGATGGCTTGTGAATTTGCTCTCAAGGTGCTTATGAAAGGGATCCTGATTGATTGAAAT
TCATGTTTTCTCAAGCTCCAGATTGGCTAGATTTAGATCGCCACACATTGCGCACTGGGCACTACCC
TACAAGTTTGTACTTTTCAATTTAATTATTTCTAACAGAACCGCTCCCGTCTCAAGCCTTCATGCACAT
ATGTACCTAATGAGTTTTTATAGCAAAGAAATAAATTTGCTGTTGATTTTTGTATGAATTTTTTACAA
AAAGATCCTGAATAAGCATTGTTTTATGAATTTACATTTTCCCTACCATTTAGCAATTTCTGAATGG
TAATAATGTCTAAATCTTTTCTTTCTGAATTTGCTTGTACATTTTTTTTTTACCTTTCAAAGGTTTT
TAATTTATTTTGTTTTTATTTTGTACGATGAGTTTTCTGCAGCGTACAGAATTGTTGCTGTGATCTT
ATTTTCAGAAAGTGAGAGGAGGGACCGTAGGCTTTTCGGAGTGACACCAACGATTGTGCTTTTCTGGT
CTGTCTAGGAGCTGTATAAGAAGCCAGGGGCTCTTTTAACTTTCAACACTAGTAGTATTACGAGGG
GTGGTGTGTTTTTCCCTCCGTGGCAAGGGCAGGGAGGGTTGCTTAGGATGCCCCGCCACCTGGGAGGC
TTGCCAGATGCCGGGGCAGTCAGCATTAATGAAACTCATGTTTAACTTCTCTGACCACATCGTCAGGA
TAGAATTTCTAATTTGAGTTTTTCAAAGACCTTTTGAAGCATGTGAGCAATGCATGGGGCACAGTGGGGCT
CTTTACCCTTTGGGTTTTTCCACTGCGCCAGCGTGGCCAGCCCTGGATTTTGGAGCCTGTGCTTTCCAG
GAACCCAGGGACCTTTGTTGCTGGTGAACCTGCAGGGAGGGTATGATTGCTGACCAGGACAGCCAGTC
TTTACTCTTTTCTCTTCAACAGTAACGTACAGTCACGTTTTACTGGTAACCTATTTTCCAGCATGAA
GCCACAGTTTCAATCCAAAGTGATATTGGGTTCAAGCTTGGGGGAGAGTTTCAAGACACCGGTGCTC
AGGAGGGACCCAGAGCCGAGTTTCCGAGTTTGGTAAAGTTTACAGGGTAGCTTCTGAAATTAACCTAAAC
TTTTGACCAAATGAGTGCAGATTCTTGGATTCACTTGGTCACTGGGCTGCTGATGGTCAGCTGTAGACA
GTGGTTTGAGAGCAGGCAGAACGGTCTTGGGACTTGTGTTGACTTTCCCTCCCTGGTGGCCACTCTTGC
TCTGAAGCCAGATTGGCAAGAGGAGCTGGTCCATTCCCATTATGACACAGAGCAGTGGCAGGGCCCA
GCTAGCAGGCTCTTCTGGCCTCCTTGGCCTCATTCTCTGCATAGCCCTCTGGGGATCCTGCCACCTGCC
TCTTACCCTCGCGTGGCTTATGGGGAGGAATGCATCATCTCACTTTTTTTTTTAAAGCATGATGGGAT
AATAGTGGCTGCTGAGGGCAGGTTATCAGTGGGGGAGTAACTTAACTCAATCTCAATCAATGGAGACGC
CCTCTGCAAGGCCCTGGCAGGGGGAGGCACGTTTCTCTGTCAGCTCACTCCAGCTTCAAAATGTGCTG
AGAGCATTACTGTGTAGCTTTTCTTTGAAGACACACTCGGCTCTTCTCCACAGCAAGCGTCCAGGGCAG
ATGGCAGAGGATCTGCTCGGCGTCTGCAGGCGGGACCAGTCAAGGAGGGTCTCTCATGTGTTCTCCC
TGTGGGTCTTGGACCTTTAGCCTTTTTCTCTCTTGGCAAAGGCCTTGGGGGCACTGGCTGGGAGTCAGC
AAGCGAGCACTTTATATCCCTTTGAGGGAAACCTTGATGACGCCACTGGGCCTCTTGGCGTCTGCCCTGC
CCTCGCGGCTTCCCGCCGTGCCGCGAGCGTGCACAGTGCACGCCACCCACCAGCAGGCGGCTGTCCCGGA
GGCCGTGGCCCGTGGGACTGGCCGCCCCCTCCCGAGCGTCCAGGGCTCTGGTCTGGAGGGCCACTTTG
TCAAGGTGTTTTAGTTTTCTTTACTTCTTTTGAATCTGTTTGAAGGGGAAGGACCATTTCGTAATG
GTCTGACACAAAAGCAAGTTTGATTTTTGACCACTAGCAATGGACTTGTGTTTTTCTTTTGTATCAG
AACATTCCTTTCTTTACTGGTCAAGCCACGTGCTCATTCCATTCTCTTTTGTAGACTTTGGGCCACG
TGTTTTATGGGCATTGATACATATATAAATATATAGATATAAATATATGAATATATTTTTTTAAGTTT
CCTACACCTGGAGTTGATGAGTGTACGACCGGCATGACTTTATATGTATACAGATTTTGACGCCA
AACTCGGCAGCTTTGGGGAAGAAGAAAAATGCCTTTCTGTTCCCTCTCATGACATTTGCAGATACAAA
GATGGAATTTTTCTGTAAACAAAACCTTGAAGGAGAGGAGGGCGGGAAGTTTGCCTTTATTGAAC
TATTCTTAAGAAATGTACTTTTTATTGTAAGAAAAATAAAAAGGACTACTTAAACATTTGTATATTA
GAAAAAAGTTTATCTAGCACTTGTGACATACCAATAATAGAGTTTATGTATTTATGTGAAACAGTGT
TTTAGGGAACTACTCAGAATTCACAGTGAAGTGCCTGTCTCTCGAGTTGATTTGGAGGAATTTGTT
TTGTTTTGTTTTGTTTTGTTTTCTTTTATCTCTTCCACGGGGCAGGCGAGCGCCGCCCTCACTGGC
CTTGTGACGGTTTTATTCTGATTGAGAAGTGGCGGAGTGAAGAGTCCCTTTTCCGACAGCTGTGTT
GACTTTTTAATTACTTTTAGGTGATGTATGGCTAAGATTTCACTTTAAGCAGTCGTGAACGTGTGCGAGCA
CTGTGGTTTTACAATTATACTTTGCATCGAAAGGAAACATTTCTTCAATGTAACGAAGCTGAGCGTGTTC
TTAGCTCGGCCTCACTTTGTCTCTGGCATTGATTAAGAGTCTGCTATTGAAAGAAAAAG

HDAC5

SEQ ID NO:98

>gi|13259520|ref|NM_005474.2| Homo sapiens histone deacetylase 5 (HDAC5), mRNA

ATGAACCTCTCCCAACGAGTCGGATGGGATGTAGGTGCGGAACCATCCTTGGAAATCCTGCCGCGGACTT

CTCTGCACAGCATCCCTGTGACAGTGGAGGTGAAGCCGGTGTCTGCCAAGAGCCATGCCAGTTCCATGGG
 GGGTGGGGGTGGAGGCAGCCCCAGCCCTGTGGAGCTACGGGGGGCTCTGGTGGGCTCTGTGGACCCACA
 CTGCGGGAGCAGCAACTGCAGCAGGAGCTCCTGGCGCTCAAGCAGCAGCAGCAGCTGCAGAAGCAGCTCC
 TGTTCCGCTGAGTTCCAGAAACAGCATGACCACCTGACAGGCAGCATGAGGTCCAGCTGCAGAAGCACCT
 CAAGCAGCAGCAGGAGATGCTGGCAGCCAAGCAGCAGCAGGAGATGCTGGCAGCCAAGCGGCAGCAGGAG
 CTGGAGCAGCAGCGGCAGCGGAGCAGCAGCGGCAGGAGAGCTGGAGAAGCAGCGGCTGGAGCAGCAGC
 TGCTCATCCTGCGGAACAAGGAGAAGAGCAAAAGAGAGTGGCATTGCCAGCACTGAGGTAAAGCTGAGGCT
 CCAGGAATTCCTCTTGTGCAAGTCAAAGGAGCCACACCAGGCGGCTCAACCATTCCCTCCACAGCAC
 CCCAATGCTGGGGAGCCACCATGCTTCTTTGGACCAGAGTTCCCCTCCCCAGAGCGGCCCCCTGGGA
 CGCCTCCCTCCTACAACTGCCTTTGCCTGGGCCCCACGACAGTCCGAGACGACTTCCCCCTCCGCAAAAC
 AGCCTCTGAACCCAACCTGAAAGTGCCTTCAAGGCTAAACAGAAGGTGGCTGAGCGGAGAAGCAGTCCC
 CTCCTGCGTGCAGGATGGGACTGTTATTAGCACCTTTAAGAAGAGAGCTGTTGAGATCACAGGTGCCG
 GGCTGGGGCGTCTGTCCTGTGTAACAGCGCACCCGGCTCCGGCCCCAGCTCTCCCAACAGCTCCACAG
 CACCATCGCTGAGAATGGCTTACTGGCTCAGTCCCAACATCCCCACTGAGATGCTCCCTCAGCACCGA
 GCCCTCCCTCTGGACAGCTCCCCCAACAGTTTACGCTCTACAGTCTCCTTCTCTGCCAACATCTCCC
 TAGGGCTGCAGGCCACGGTCACTGTCAACCACTCACACCTCACTGCCTCCCCGAAGCTGTGCACACAGCA
 GGAGCCGAGAGGAGCGGCTCCAGTCCCTGCGGCAGGGTGGCAGCTGACCGGCAAGTTTATGAGCACA
 TCCTCTATTCTGGCTGCCTGCTGGGCGTGGCACTGGAGGGGACGCGGAGCCCCACGGGCATGCCCTCCC
 TGCTGCAGCATGTGCTGTGCTGGAGCAGGCCCGGCAGCAGAGCACCTCATTTGCTGTGCCACTCCACGG
 GCAGTCCCCACTAGTGACGGGTGAACGTGTGGCCACCAGCATGCGGACGGTAGGCAAGCTCCGCGGCAT
 CGGCCCTGAGCCGCACTCAGTCCCTCACCGCTGCCGAGAGTCCCCAGGCCCTGCAGCAGCTGGTTCATGC
 AACACAGCACCAGAGTTTCTGGAGAAGCAGAAGCAGCAGCTACAGCTGGGGCAAGATCCTCACCAA
 GACAGGGGAGCTGCCAGGCAGGCCACCACCCACCTGAGGAGACAGAGGAGGAGCTGACGGAGCAGCAG
 GAGGTCTTGTGGGGGAGGGAGCCCTGACCATGCCCGGGAGGGCTCCACAGAGAGTGAGAGCACACAGG
 AAGACCTGGAGGAGGAGGACGAGGAAGAGGATGGGGAGGAGGAGGAGGATTGCATCCAGGTTAAGGACGA
 GGAGGGCAGAGTGGTGTGAGGAGGGGCCGACTTGGAGGAGCCTGGTGTGGATACAAAAAAGTGTTC
 TCAGATGCCAGCCGCTGCAGCCTTTGCAAGTTTACAGGCGCCCTCAGCCTGGGCCACTGTGCCCCACC
 AGGCCCTGGGCCGTACCCAGTCTCCTCCTGCTGCCCTGGGGGCATGAAGAGCCCCCAGACCCAGCCGT
 CAAGCACCTCTTACACAGGTGTGGTCTACGACACGTTTATGCTAAAGCACAGTGCATGTGCGGGAAC
 ACACACGTGCACCTGAGCATGCTGGCCGGATCCAGAGCATCTGGTCCCGGCTGCAGGAGACAGGCCCTGC
 TTAGCAAGTGCAGCGGATCCGAGGTCCGAGGTCGCAAGCCACGCTAGATGAGATCCAGACAGTGCATCTGAATA
 CCACACCTGCTCTATGGGACCAGTCCCTCAACCGGCAGAAGCTAGACAGCAAGAAGTTGCTCGGCCCC
 ATCAGCCAGAAGATGTATGCTGTGCTGCCCTTGTGGGGGCATCGGGGTGGACAGTGACACCGTGTGGAATG
 AGATGCACTCTCCAGTGTGTGCGCATGGCAGTGGGCTGCCCTGCTGGAGCTGGCCTTCAAGGTGGCTGC
 AGGAGAGCTCAAGAATGGAATTTGCCATCATCCGCCCCCAGGACACCACGCGGAGGAATCCACAGCCATG
 GGATTCTGCTTCTTCAACTCTGTAGCCATCACCGCAAACTCCTACAGCAGAAGTTGAACGTGGGCAAGG
 TCCTCATCGTGGACTGGGACATTACCATGGCAATGGCACCCAGCAGGCGTTCTATAATGACCCCTCTGT
 GCTCTACATCTCTGTGCATCGCTATGACAAACGGGAACCTTCTTCCAGGCTCTGGGGCTCCTGAACAGGTT
 GGTGGAGGACCAGGCGTGGGGTACAATGTGAACGTGGCATGGACAGGAGGTGTGGACCCCCCATTTGGAG
 ACTGGAGTACCTTACAGCCTTACAGCAGTGGTGTATGCCATTGCCACAGATTCTCACCTGATGTGGT
 CCTAGTCTCCGCCGGGTTTGTATGCTGTGAAGGACATCTGTCTCTCTGGGTGGCTACTCTGTACCCGCC
 AGATGTTTTGGCCACTTGACCAGGCAGCTGATGACCTTGGCAGGGGGCCGGGTGGTGTGTCGCTGGAGG
 GAGGCCATGACTTGACCGCCATCTGTGATGCCCTCTGAGGCTTGTGTCTCGGCTCTGCTCAGTGTAGAGCT
 GCAGCCCTTGGATGAGGCAGTCTTGCAGCAAAAGCCCAACATCAACGCAGTGGCCACGCTAGAGAAAGTC
 ATCGAGATCCAGAGCAAACTGGAGCTGTGTGCAGAAGTTCCGCCGTGGTCTGGGCGGCTCCTTGCAG
 AGGCCCAAGCAGGTGAGACCGAGGAGGCGAGACTGTGAGCCCATGGCCTTGTCTGCTGGTGGGGCCGA
 GCAGGCCAGGCTGCGGCAGCCCGGAAACAGCCCCCGGCGAGAGGCCCATGAGCAGGAGCCT
 GCCCTGTGACGCCCCGGCCCCATCCCTCTGGGCTTACCATTGTGATTTTGTATTTTCTATTAAA
 AACAAAAAGTCACACATTC

HDAC6

SEQ ID NO:99

>gi|13128863|ref|NM_006044.2| Homo sapiens histone deacetylase 6 (HDAC6), mRNA

GGGAGTCCCCTGAGGAGCGGGGCTGGTTGAAACGCTAGGGGCGGGATCTGGCGGAGTGAAGAAGCCGCG
 GCAGGGGCCAAGCCTCCTCAACTATGACCTCAACCGGCCAGGATTCCACCACAACAGGCAGCGAAGAAG
 TAGGCAGAAACCCCGAGTGCGCCCTCAGGACTCCAGTGTCACTTGAAGCGAAATATTAAGGAGGAGCC
 GTTCCCCGCTCTATCCCCAATCTAGCGGAGGTAAAGAAAGGCAAAATGAAGAAGCTCGGCCAAGCAA
 TGAAGAAGACCTAATCGTGGGACTGCAAGGGATGGATCTGAACCTTGAGGCTGAAGCACTGGCTGGCAC
 TGGCTTGGTGTGGATGAGCAGTTAAATGAATTCCATTGCCCTCTGGGATGACAGCTTCCCGGAAGGCCCT
 GAGCGGCTCCATGCCATCAAGGAGCAACTGATCCAGGAGGCGCTCCTAGATCGCTGCGTGTCTTTACAG
 CCCGTTTGTGTAAGAAGAGCTGATGTTGGTTACAGCCTAGAATATATTGATCTGATGGAACAC

CCAGTACATGAATGAGGGAGAACTCCGTGTCTAGCAGACACCTACGACTCAGTTTATCTGCATCCGAAC
 TCATACTCCTGTGCTGCTGCGCTCAGGCTCTGTCTCAGGCTGGTGGATGCCGCTCTGGGGGCTGAGA
 TCCGGAATGGCATGGCCATCATTTAGGCTCCTGGACATACGCCAGCACAGTCTTATGGATGGCTATTG
 CATGTTCAACCACGTGGCTGTGGCAGCCGCTATGCTCAACAGAAACACCGCATCCGGAGGGTCTTTATC
 GTAGATTGGGATGTGCACCACGGTCAAGGAACACAGTTACCTTCGACCAGGACCCAGTGTCTCTATT
 TCTCCATCCACGCTACGAGCAGGGTAGGTCTGTGCCCCACCTGAAGGCCTCTAACTGGTCCACCACAGG
 TTTCCGCCAAGGCCAAGGATATACCATCAATGTGCTTGGAAACCAGGTGGGGATGCCGGATGTGTGACTAC
 ATTGCTGCTTTCTGTCACGTCTGCTGCCAGTCCGCTCGAGTTCAGCCTCAGCTGGTCTGTGGTGGCTG
 CTGGATTGTATGCCCTGCAAGGGGACCCCAAGGGTGAGATGGCCGCCACTCCGGCAGGGTTCCGCCAGCT
 AACCACCTGCTCATGGGTCTGGCAGGAGGCAAGCTGATCTGTCTCTGGAGGGTGGCTACAACTCCGC
 GCCCTGGCTGAAGGCCTCAGTGCTTCGCTCCACACCTTCTGGGAGACCTTGCCCCATGCTGGAGTAC
 CTGGTGCCCCCTGCCGGAGTGCCAGGCTTCAGTTTCTGTGCTCTGGAAGCCCTTGAGCCCTTCTGGGA
 GGTCTTGTGAGATCAACTGAGACCGTGGAGAGGGACAACATGGAGGAGGACAATGTAGAGGAGAGCGAG
 GAGGAAGGACCTGGGAGCCCCCTGTGCTCCCAATCCTGACATGGCCAGTGTACAGTCTCGCACAGGGC
 TGGTCTATGACCAAAATATGATGAATCACTGCAACTTGTGGGACAGCCACCACCCTGAGGTACCCAGCG
 CATCTTGGCGATCATGTGCCGTCTGGAGGAGCTGGGCTTCCGGGGCGCTGCCCTACCTTGACACCGCGC
 CCTGCCACAGAGGCTGAGCTGCTCACCTGTACAGTGTGAGTACGTGGGTCTCTCCGGGCCACAGAGA
 AAATGAAAACCCGGGAGCTGCACCGTGAGAGTTCCAATTGACTCCATCTATATCTGCCCCAGTACCTT
 CGCCTGTGCACAGCTTGCCACTGGCGCTGCTGCCGCTGGTGGAGGCTGTGCTCTCAGGAGAGGTTCTG
 AATGGTGTGCTGTGGTGGTGGTCCCGCAGGACACACGACAGAGCAGGATGCAGCTTCCGGTTTTTGTCTTT
 TCAACTCTGTGGCTGTGGCTGCTCGCCATGCCAGACTATCAGTGGGCATGCCCTACGGATCCTGATTGT
 GGATTTGGGATGTCCACCACGGTAATGGAACCTCAGCACATGTTTGGAGGATGACCCAGTGTGCTATATGTG
 TCCCTGACCGCATGATCATGGCACCTTCTTCCCATGGGGATGAGGGTGCCAGCAGCCAGATCGGCC
 GGGCTGCGGGCACAGGCTTACCGTCAACGTGGCATGGAACGGGGCCCCGATGGGTGATGCTGACTACCT
 AGCTGCCTGGCATCGCCTGGTGTCTCCCATTTGCTACGAGTTTAAACCAGAACTGGTGTGCTGTGCTCAGCT
 GGCTTTGATGCTGCACGGGGGGATCCGCTGGGGGGCTGCCAGGTGTACCTGAGGGTTATGCCACCTCA
 CCCACCTGCTGATGGGCCTTGCCAGTGGCCGCATATCTTATCTAGAGGGTGGCTATAACCTGACATC
 CATCTCAGAGTCCATGGCTGCCCTGCACTGCTCCTTCTGGAGACCCACCACCCTGTGACTACCTTGCCA
 CGGCCCCACTATCAGGGGGCCTGGCCTCAATCACTGAGACCATCCAAGTCCATCGCAGATCTTGGCGCA
 GCTTACGGGTATGAAGGTAGAAGACAGAGAAGGACCCTCCAGTTCTAAGTTGGTACCAAGAAGGCACC
 CCAACCAGCCAAACCTAGGTTAGCTGAGCGGATGACCACAGGAGAAAGAAGTTCTGGAAGCAGGCATG
 GGGAAAGTCACTCGGCATCATTTGGGGAAGAGTCCACTCCAGGCCAGACTAACTCAGAGACAGCTGTGG
 TGGCCCTCACTCAGGACACGCCCTCAGAGGCAGCCACAGGGGGAGCCACTCTGGCCAGACCATTTCTGA
 GGCAGCCATTGGGGGAGCCATGCTGGCCAGACACCTCAGAGGAGGCTGTGCGGGAGCCACTCCGGAC
 CAGACCACCTCAGAGGAGACTGTGGGAGGAGCCATTCTGGACCAGACCACCTCAGAGGATGCTGTTGGG
 GAGCCACGCTGGGCCAGACTACCTCAGAGGAGGCTGTAGGAGGAGCTACACTGGCCAGACCACCTCGGA
 GGCAGCCATGGAGGGAGCCACACTGGACCAGACTACGTCAGAGGAGGCTCCAGGGGGCACCAGAGCTGATC
 CAAACTCCTCTAGCCTCGAGCACAGACCACAGACCCCCCAACCTCACCTGTGCAGGGAATACACCCC
 AGATATCTCCAGTACACTGATTGGGAGTCTCAGGACCTTGGAGCTAGGCAGCGAATCTCAGGGGGCCTC
 AGAATCTCAGGCCCCAGGAGAGGAGAACCTACTAGGAGAGGCAGCTGGAGGTGAGGACATGGCTGATTG
 ATGCTGATGCAGGGATCTAGGGGCCCTCACTGATCAGGCCATATTTTATGCTGTGACACCACTGCCCTGGT
 GTCCCATTTGGTGGCAGTATGCCCATACCTGCAGCAGGCCTAGACGTGACCCAACTTGTGGGGACTG
 TGGAAACAATCCAAGAGAATTGGGTGTGCTCTCTTGTCTATCAGGTCTACTGTGCTCGTTAATGCGC
 CACATGCTCCAACACCATGGAAATCTGGACACCCGCTGGTCTCAGCTACATCGACCTGTGAGCCTGGT
 GTTACTACTGTGAGGCCTATGTCCACCACAGGCTCTCTAGATGTGAAGAACATCGCCCCACCAGAACAA
 GTTTGGGGAGGATATGCCCCACCCACACTAAGCCCCAGAATACGGTCCCTCTTACCTTCTGAGGCCAC
 GATAGACAGCTGATGCTCATTCCAGCCTGTACCTTGGATGAGGGGTAGCCTCCCACTGCATCCCATCT
 GAATATCTTTGCAACTCCCCAAGAGTGCTTATTTAAGTGTAAATACTTTTAAGAGAACTGCGACGATTA
 ATTGTGGATCTCCCCCTGCCATTGCTGCTTGGAGGGCACCACCTACTCCAGCCAGAGGAAAGGGGGG
 CAGCTCAGTGGCCCCAAGAGGGAGCTGATATCATGAGGATAACATTGGCGGGAGGGGAGTTAACTGGCAG
 GCATGGCAAGGTTGCATATGTAATAAAGTACAAGCTGTT

HDAC7

SEQ ID NO:100

>gi|13259521|ref|NM_015401.1| Homo sapiens histone deacetylase 7A (HDAC7A),
 transcript variant 1, mRNA
 ATAATACCTACCTTGACAGGACCACGACAGGATTAAGTGAGGAAAAACCCCATGAGAGTGTTTTGGCATT
 GTCAAGTGAGCCTGAGGAGGCTGAGGGGGGATCAGGCTGTATCATGCCCCGAGGACAAACTTTCCAGT
 TTACCTGCTCCCTCTCTCTGTCCCTAGGCTGCCAGCCCTGTGCAGACACACAGGCCCTCAGCCGC
 AGCCCATGGACCTGCGGGTGGGCCAGCGCCCCCAGTGGAGCCCCCACCAGAGCCACATTGCTGGCCCT
 GCAGCGTCCCCAGCGCCTGCACCACCACTCTTCTAGCAGGCTGCAGCAGCAGCGCTCGGTGGAGCCC
 ATGAGGCTCTCCATGGACACGCCGATGCCGAGTTGCAGGTGGGACCCAGGAACAAGAGCTGCGGCAGC

TTCTCCACAAGGACAAGAGCAAGCGAAGTGCTGTAGCCAGCAGCGTGGTCAAGCAGAAGCTAGCGGAGGT GATTCTGAAAAAACAGCAGGCGGCCCTAGAAAGAACAGTCCATCCCAACAGCCCCGGCATTCCCTACAGA ACCCTGGAGCCCCCTGGAGACGGAAGGAGCCACCCGCTCCATGCTCAGCAGCTTTTTCGCTCCTGTTCCCA GCCTGCCCAGTGACCCCCAGAGCACTTCCCTCTGCGCAAGACAGTCTCTGAGCCCAACCTGAAGCTGCG CTATAAGCCCAAGAAGTCCCTGGAGCGGAGGAAGAATCCACTGCTCCGAAAGGAGAGTGCGCCCCCAGC CTCCGGCGGCGGCCCGCAGAGACCTCGGAGACTCCTCCCAAGTAGTAGCAGCACGCCCGCATCAGGGT GCAGCTCCCCCAATGACAGCGAGCACGGCCCCAATCCCATCTGGGCTCGGAGGCGCTCTTGGGCCAGCG GCTGCGGCTGCAGGAGACTTCTGTGGCCCCGTTGCGCTTGCCGACAGTGTCTTGCTGCCCGCAATCACT CTGGGGCTGCCCCGCCCTGCCAGGGCTGCAGTGCAGCGAGGCCATCCGACTCTGGGCCCTCGGGGGC CAATCCTGGGGAGCCCCACACTTCCCTCTTCTGCCCCATGGCTTGGAGCCCCAGGCTGGGGGCACCTT GECCTCTGCGCTGCAGCCCATTTCTCTCTGGACCCCTCAGGCTCTCATGCCCGCTGCTGACTGTGCC GGGCTTGGGGCCCTTGCCCTTCCACTTTGCCAGTCTTAATGACCACCGAGCGGCTCTCTGGGTGAGGCC TCCACTGGCCACTGAGCCGGAATCGCTCAGAGCCCCCTGCCCCCAGTGCCACCGCTCCCCCACCAGCCGGG CCCCATGCAGCCCCGCTGGAGCAGCTCAAACTCACCTCCAGGTGATCAAGAGGTGAGCCAAGCCGAGT GAGAAGCCCCGGCTGCGGCAGATACCTCGGCTGAAGACCTGGAGACAGATGGCGGGGGACCGGGCCAGG TGGTGGACGATGGCCTGGAGCACAGGGAGCTGGGCCATGGGCAGCCTGAGGCCAGAGGCCCGCTCCTCT CCAGCAGCACCTCAGGTGTTGCTCTGGGAAACAGCAGCGACTGGCTGGGCGGCTCCCCCGGGGCAGCACC GGGGACACTGTGCTGCTTCTCTTGCCCCAGGGTGGGCACCGGCTCTGTCCCGGGCTCAGTCTTCCCCAG CCGCACCTGCCTCACTGTGAGCCCCAGAGCCTGCCAGCCAGGCCGAGTCTCTCCAGTCAAGACCCC TGCCAGGACCTGCCCTTACCACAGGGCTGATCTATGACTCGGTGATGCTGAAGCACCACTGCTCCTGC GGTGACAACAGCAGGCACCCGAGCACGCCGGCCGCATCCAGAGCATCTGGTCCCGGCTGCAGGAGCGGG GGCTCCGGAGCCAGTGTGAGTGTCTCCGAGGCCGGAAGGCCTCCCTGGAAGAGCTGCAGTGGTCCACTC TGAGCGGCACGTGCTCCTCTACGGCACCAACCCGCTCAGCCGCTCAAACCTGGACAACGGGAAGCTGGCA GGGCTCCTGGCACAGCGGATGTTTGTGATGCTGCCCTGTGGTGGGGTGGGGTGGACACTGACACCATCT GGAATGAGCTTCATTCTCCTCAATGCAGCCCGCTGGGCCGCTGGCAGTGTCACTGACCTCGCCTTCAAAGT GGCTTCTCGTGAGCTAAAGAATGGTTTCGCTGTGGTGGGCCCCAGGACACCATGCAGATCATTCACA GCCATGGGCTTCTGCTTCTTCAACTCAGTGGCCATCGCCTGCCGGCAGCTGCAACAGCAGAGCAAGGCCA GCAAGATCCTCATTTGTAGACTGGGACGTGCACCATGGCAACGGCACCCAGCAAACCTTCTACCAAGACCC CAGTGTGCTCTACATCTCCCTGCATCGCCATGACGACGGCAACTTCTTCCCGGGAGTGGGGCTGTGGAT GAGGTAGGGGCTGGCAGCGGTGAGGGCTTCAATGTCAATGTGGCCTGGGCTGGAGGTCTGGACCCCCCA TGGGGGATCCTGAGTACCTGGCTGCTTTCAGGATAGTCGTGATGCCATCGCCCCGAGAGTCTCTCCAGA CCTAGCTCTGGTGTCTCTGCTGGATTGTATGCTGCTGAGGGTCAACCGGCCCACTGGGTGGCTACCATGTT TCTGCCAATGTTTTGGATACATGACGCAGCAACTGATGAACCTGGCAGGAGGCGCAGTGGTGTGCGCT TGGAGGGTGGCCATGACCTCACAGCCATCTGTGACGCCTCTGAGGCCTGTGTGGCTGCTCTTCTGGGTAA CAGGGTGGATCCCCCTTTCAGAAGAAGGCTGGAAACAGAAACCAACCTCAATGCCATCCGCTCTCTGGAG GCCGTGATCCGGGTGCACAGTAAATACTGGGGCTGCATGCAGCGCTGGCCTCCTGTCCAGACTCCTGGG TGCCTAGAGTGCCAGGGGCTGACAAAGAAGAAGTGGAGGCAGTGACCGCACTGGCGTCCCTCTCTGTGGG CATCCTGGCTGAAGATAGGCCCTCGGAGCAGCTGGTGGAGGAGGAAGAACCTATGAATCTCTAAGGCTCT GGAACCATCTGCCCGCCCAACATGCCCTTGGGACCTGGTTCTCTTCTAACCCTGGCAATAGCCCCCATT CCTGGGTCTTTAGAGATCCTGTGGGCAAGTAGTTGGAACAGAGAACAGCCTGCCTGCTTTGACAGTTAT CCAGGGAGCGTGAGAAAAATCCTGGGTCTAGAATGGGAACCTGGAGAGGACCTGAGAGGAGACGGGCTG GGCGGCGACCCCAACAGGGCTCTCGAGAACAGATTCTCCCTCCAGTATGGGCCCTGGCTGTGCCCCCA TTCTCAGGACTGCACAGAGGAGGACTGGCTCCGGCTCCGTCCGGCTCACCTTAACCACTATTCTTGGC TCTGCAAACCCAGACTTTGCACACAGCCCCAGGCTCCACACAGAAATGTGAACCTTGGCCTCAGACAGGC TGGCCCTTCTTAGGCTCTAGGGGCTAGGGGGGAGTGGGGAGCCAAGAGGTCCCATATTCTGAGTGCAGG GGTAGTCCCTCTCAGGCTCTTCTCAGACGACTCTGGAGGCTTCCCTTACCACCGGGCACTGACATGAA GCTCCCTGCACCGAGACTGGCAGCCCTCCATCTGGTCCGTACCCCTGCCAGAGGCCCTTGCATCAA CCTCCTGGCGATGCCCTGGTGGAGCAGATGGGTGCTCTGGGAGTCTGTGCTTCTGATCCAATGGTGCC AAACCCCTTCACTTCCCCCAGAAGCGCAGCATACCCCTGGGACCCCTCGGCCACTGCCCACTCGGGGAGCC TTCTCTGTTTCTGGGGCTCCCCACCATAGCTCTGATTCCACCCCAATAGGAATAGCCTGACTGAGG TGGGAAGGGGTGGGAGAGAAGATACAGACATGAGGAGGGGAGGCTGCTCTGGCAAGTCTTCAAGGCTTT TGGGGGTCCAGGCCTGGGGTCAAGAAGGAAAATGTGTGTGAGCATGTGTGTGAGTGAGGCGTGTGTGTGA GCGTGTGTGTGAGTGAGGCGTGTGTGTGTGTCTTTCTAGGACCCACCATACCTGTGTATGTATGCATG TTTTTGTAAAAAGGAAGAAAATGGAaaaaaatCTGAACAATAAATGTTTATTGCTTTAAAAAaaaaa AAAAAA
>gi 13259523 ref NM_016596.2 Homo sapiens histone deacetylase 7A (HDAC7A), transcript variant 2, mRNA SEQ ID NO:101 ATAATACCTACCTTGCAGGACCACGACAGGATTAAGTGAGGAAAAACCCCCATGAGAGTGTTTTGCCATT GTCAAGTGAGCCTGAGGGAGGCTGAGGGGGATCAGGCTGTATCATGCCCCGAGGACAAACTTCCAGT TTACCTGTGCTCCTCTCTCTGTCTCCCTAGGCTGCCCGAGGCCCTGTGCAGACACACAGGCCCTCAGCCGC AGCCCATGGACCTGCGGGTGGGCCAGCGGCCCCAGTGGAGCCCCCACCAGAGCCACATTGCTGGCCCT GCAGCGTCCCCAGCGCCTGCACCACCACCTCTTCTAGCAGGCTGCAGCAGCAGCGCTCGGTGGAGCCC ATGAGGCTCTCCATGGACACGCGGATGCCCGAGTTGCAGGTGGGACCCAGGAACAAGAGCTGCGGCAGC TTCTCCACAAGGACAAGAGCAAGCGAAGTGCTGTAGCCAGCAGCGTGGTCAAGCAGAAGCTAGCGGAGGT TGGGGGTCCAGGCCTGGGGTCAAGAAGGAAAATGTGTGTGAGCATGTGTGTGAGTGAGGCGTGTGTGTGA GCGTGTGTGTGAGTGAGGCGTGTGTGTGTGTCTTTCTAGGACCCACCATACCTGTGTATGTATGCATG TTTTTGTAAAAAGGAAGAAAATGGAaaaaaatCTGAACAATAAATGTTTATTGCTTTAAAAAaaaaa AAAAAA

>gi|7662279|ref|NM_014707.1| Homo sapiens histone deacetylase 9 (HDAC9-PENDING), transcript variant 3, mRNA SEQ ID NO:102

GGGGAAGAGAGGCACAGACACAGATAGGAGAAGGGCACCGCTGGAGGCCACTTGCAGGACTGAGGGTTT
TGCAACAAAACCTAGCAGCCTGAAGAACTTAAGCCAGATGGGGTGGCTGGACGAGAGCAGCTCTTGGC
TCAGCAAAGAATGCACAGTATGATCAGCTCAGTGGATGTGAAGTCAGAACTTCTGTGGGCTGGAGCCC
ATCTCACTTTAGACCTAAGGACAGACCTCAGGATGATGATGCCCGTGGTGGACCTGTGTGCTCCGTGAGA
AGCAATTGCAGCAGGAATTACTTCTTATCCAGCAGCAGCAACAAATCCAGAACGAGCTTCTGATAGCAGA
GTTTCAGAAAACAGCATGAGAAGTTGACACGGCAGCAGCAGCTCAGCTTCAGGAGCATATCAAGGAAGTT
CTAGCAATAAAAACGACAACAAGAACTCTTAGAAAAGGAGAGAAACTGGAGCAGCAGAGGCAAGAACAGG
AAGTAGAGAGGCATCGCAGAGAACAGCAGCTTCTCTCTCAGAGGCAAGAGATAGAGGACGAGAAAGGCG
AGTGGCAAGTACAGAAGTAAAGCAGAAAGCTTCAAGAGTTCTTACTGAGTAATCAGCAACGAAAGACACT
CCAATCTAATGGAAAAAATCATTCCGTGAGCGGCCATCCCAAGCTCTGGTACACCGGCTGCCCCACACAT
CAATGGATCAAAGCTCTCCACCCCTTAGTGGAAACATCTCCATCTCAAGTACAGTACATTACCAGGACACA

HDAC8

SEQ ID NO:103

>gi|8923768|ref|NM_018486.1|Homo sapiens histone deacetylase 8 (HDAC8), mRNA
GCCAGATCTGGAAGGTGGCTGCGGAACGGTTTAAAGCGGAAGATGGAGGAGCCGGAGGAACCGGCGGACA
GTGGGCAGTCGCTGGTCCCGTTTATATCTATAGTCCCGAGTATGTCAGTATGTGTGACTCCCTGGCCAA
GATCCCCAAACGGGCCAGTATGGTGCATTCTTGATTGAAGCATATGCACTGCATAAGCAGATGAGGATA
GTTAAGCCTAAAGTGGCCCTCATGGAGGAGATGGCCACCTTCCACACTGATGCTTATCTGCAGCATCTCC
AGAAGGTCAGGCCAAGAGGGCGATGATGATCATCCGGAATCCATAGAATATGGGCTAGGTTATGACTGCCC
AGCCACTGAAGGAGATTTTACTATGCAAGCAGCATATAGGAGGGGTACGATCAGAGCTGCCCAATGCCCTG
ATTGACGGAATGTGCAAAGTAGCAATTAAGTGGTCTGGAGGGTGGCATCATGCAAGAGAGATGAAGCAT

122

CATCCCCGACTTTCGCTCTCCATCCACCGGCTCTATGACAACTAGAGAAGTACCATCTTCCCTACCCA
 GAGGCCATCTTTGAGATCAGCTATTTCAAGAAACATCCGGAACCTTCTTCGCCCTCGCCAAGGAACCTCT
 ATCCTGGGCAGTTCAAGCCAACCATCTGTCACTACTTCATGCGCCTGCTGAAGGACAAGGGGCTACTCCT
 GCGCTGCTACACGCAGAACATAGATACCTGGAGCGAATAGCCGGGCTGGAACAGGAGGACTTGGTGGAG
 GCGCACGGCACCTTCTACACATCACACTGCGTCAAGCGCCAGCTGCCGGCACGAATACCCGCTAAGCTGGA
 TGAAGAGAAGATCTTCTCTGAGGTGACGCCCCAAGTGTGAAGACTGTGAGAGCCTGGTGAAGCCTGATAT
 CGTCTTTTTTGGTGAGAGCCTCCAGCGCGTTTCTTCTCTGTATGCACTCAGACTTCTGAAGGTGGAC
 CTCTCTGTGTCATGGGTACCTCCTTGCAGGTGCAGCCCTTTCCTCCTCATCAGCAAGGCACCCCTCT
 CCACCCCTCGCTGCTCATCAACAAGGAGAAAGCTGGCCAGTCCGACCTTTCCTGGGGATGATTATGGG
 CCTCGGAGGAGGCATGGACTTTGACTCCAAGAAGGCCCTACAGGGACGTGGCCTGGCTGGGTGAATGCGAC
 CAGGGCTGCCTGGCCCTTGTGAGCTCCTTGGATGGAAGAAGGAGCTGGAGGACCTTGTCCGGAGGGAGC
 ACGCCAGCATAGATGCCAGTCCGGGGCGGGGTCCCAACCCAGCACTTCAGCTTCCCCCAAGAAGT
 CCGCCACCTGCCAAGGACGAGGGCAGGACACAGAGAGGGAGAAACCCAGTGACAGCTGCATCTCCCA
 GGCGGATGCCGAGCTCCTCAGGGACAGCTGAGCCCAACCGGGCCTGGCCCCCTCTTAACAGCAGTTCT
 TTGTCTGGGGAGCTCAGAACATCCCCCAATCTCTTACAGCTCCCTCCCCAAACTGGGGTCCCAGCAACC
 CTGGCCCCCAACCCAGCAAATCTCTAACACCTCTAGAGGCCAAGGCTTAAACAGGCATCTCTACCAGC
 CCCACTGTCTCTAACACTCTCTGAGCTCCTTCCAGGACAGGGAGCTTGGGGCCCCACTCTGTCTCTGGCCCCG
 GGCTACCCAGAATTTTAACTCTTCCAGGACAGGGAGCTTGGGGCCCCACTCTGTCTCTGGCCCCG
 GGGCTGTGGCTAAGTAAACCTAACCTACCCAGTGTGGGTGTGGGCTCTGAATATAACCCACA
 CCCAGCTAGGGGGAGTCTGAGCCGGAGGGTCCCGAGTCTCTGCCTCAGCTCCCAAAGTGGGTGGTG
 GGCCCCCTTACGTGGGACCCACTTCCCATGCTGGATGGGCAGAAGACATTGCTTATTGGAGACAAATTA
 AAAACAAAAACAATAACAAAAA

hsIRT3

SEQ ID NO:106

gi|13775603|ref|NM_012239.3| Homo sapiens sirtuin silent mating type
 information regulation 2 homolog 3 (*S. cerevisiae*) (SIRT3), mRNA

GGCGCCGGGGCGGGGTGGGAGGCGGAGGCGGGCGGGCGGGCGGGCGGGCGGGCGGGCGGGG
 GAGTCCGGAGGACTCCTCGGACTGCGCGGAACATGGCGTTCTGGGGTTGGCGCGCGCGGCGAGCCCTCCG
 GCTGTGGGGCCGGTAGTTGAACGGGTGAGGCGGGGGAGGGCGTGGGGCCGTTTCAGGCCCTGCGGCTGT
 CGGCTGGTGTCTGGCGGAGGACGATGTGAGTGCAGGGGCTGAGAGGAGCCATGGGGCCCGCGGTGAGC
 CTTTGGACCCGCGCGCCCTTGCAGAGGCTCCAGACCCGAGGTGCCAGGGCATTCGGAGGCGAGCC
 GAGGGCAGCAGCTCCAGTTCTTCTTTTCGAGTATTAAAGGTGGAAGAAGGTCCATATCTTTTCTGTG
 GGTGCTTCAAGTGTGTGGAGTGGAGGAGCAGTGAACAAGGGGAAGCTTTCCCTGCAGGATGTAGCTG
 AGCTGATTCGGGCGAGAGCCTGCCAGAGGGTGGTGGTCTGTTGGGGCCGGCATCAGCACACCCAGTGG
 CATTCAGACTTCAGATCGCGGGGAGTGGCTGTACAGCAACCTCCAGCAGTACGATCTCCCGTACCCC
 GAGGCCATTTTGAACCTCCATTCTTCTTTCAACCCCAAGCCCTTTTCACTTTGGCCAAGGAGCTGT
 ACCCTGGAAACTACAAGCCCAACGTCACCTACTACTTTCTCCGGCTGCTTCATGACAAGGGGCTGCTTCT
 GCGGCTCTACACGCAGAACATCGATGGGCTTGAAGAGTGTGCGGCATCCCTGCCTCAAAGCTGGTTGAA
 GCTCATGGAACCTTTGCCTCTGCCACCTGCACAGTCTGCCAAAGACCTTCCCAGGGGAGGACATTGCGG
 CTGACGTGATGGCAGACAGGGTTCCTCCGCTGCCCGGTCTGCACCGGCGTTGTGAAGCCGACATTGTGTT
 CTTTGGGAGCCGCTGCCCCAGAGGTTCTTGTGCTGATGTGGTTGATTTCCCATGGCAGATCTGCTGCTC
 ATCCTTGGGACCTCCCTGGAGGTGGAGCCTTTTGGCAGCTTGACCGAGGCGGTGCGGAGCTCAGTTCCCC
 GACTGCTCATCAACCGGACTTGGTGGGGCCCTTGGCTTGGCATCCTCGCAGCAGGGACGTGGCCAGCT
 GGGGGACGTGGTTACGGCGTGGAAAGCCTAGTGGAGCTTCTGGGCTGGACAGAAGAGATGCGGGACCTT
 GTGCAGCGGGAACCTGGGAAGCTTGATGGACAGACAAATAGGATGATGGCTGCCCCACACAATAAATG
 GTAACATAGGAGACATCCACATCCCAATTCTGACAAGACCTCATGCCTGAAGACAGCTTGGGCAGGTGAA
 ACCAGAATATGTGAACCTGAGTGGACACCCGAGGCTGCCACTGGAATGTCTTCTCAGGCCATGAGCTGCAG
 TGACTGGTAGGGCTGTGTTTACAGTCAAGGGCCACCCGTCACATATACAAAGGAGCTGCTGCTGTTTG
 CTGTGTTGAACCTTCACTCTGCTGAAGCTCCTAATGAAAAAGCTTTCTTCTGACTGTGACCCCTTTGA
 ACTGAATCAGACCAACTGGAATCCAGACCGAGTCTGCTTCTGTGCTAGTTGAACGGCAAGCTCGGCA
 TCTGTGGTTACAAAGATCCAGACTTGGGCGGAGCGGTCCCCAGCCCTCTTATGTTCCGAAGTGTAGTCT
 TGAGGCCCTGGTGGCGCACTTCTAGCATGTTGGTCTCCTTTAGTGGGGCTATTTTAAATGAGAGAAAATC
 TGTCTTTCCAGCATGAAATACATTTAGTCTCCTCAAAGGGA

hsIRT4

SEQ ID NO:107

```
>gi|6912661|ref|NM_012240.1| Homo sapiens sirtuin silent mating type
information regulation 2 homolog 4 (S. cerevisiae) (SIRT4), mRNA
GTCCGTAGAGCTGTGAGAGAATGAAGATGAGCTTTGCGTTGACTTTCAGGTCAGCAAAAGGCCGTTGGAT
CGCAAAACCCAGCCAGCCGCTGCTCGAAAGCCTCCATTGGGTTATTTGTGCCAGCAAGTCCTCCTCTGGAC
CCTGAGAAGGTCAAAGAGTTACAGCGCTTCATCACCTTTTCCAAGAGACTCCTTGTGATGACTGGGGCAG
GAATCTCCACCGAATCGGGGATACCAGACTACAGGTCAGAAAAAGTGGGGCTTTATGCCCGCACTGACCG
CAGGCCCATCCAGCATGGTGATTTTGTCCGGAGTGCCCCAATCCGCCAGCGGTAAGTGGGCGAGAACTTC
GTAGGCTGGCCTCAATTCTCTCCACAGCCTAACCTGCACACTGGGCTTTGAGCACCTGGGAGAAAC
TCGGAAGCTGTACTGGTTGGTGACCCAAAATGTGGATGCTTTGCACACCAAGGCGGGAGTCGCGCCT
GACAGAGCTCCACGGATGCATGGACAGGGTCTGTGCTTGGATTGTGGGGAACAGACTCCCCGGGGGTG
CTGCAAGAGCGTTTCCAAGTCTGAACCCACCTGGAGTGCTGAGGCCCATGGCCTGGCTCCTGATGGTG
ACGTCTTTCTCTCAGAGGAGCAAGTCCGGAGCTTTCAGGTCCCAACCTGCGTTCAATGTGGAGGCCATCT
GAAACCAAGATGTCGTTTCTTTCGGGGACACAGTGAACCTGACAAGGTTGATTTTGTGCACAAGCGTGTA
AAAGAAGCCGACTCCCTCTTGGTGGTGGGATCATCTTGCAGGTATACTCTGGTTACAGGTTTATCCTCA
CTGCCTGGGAGAAAGCTCCCGATTGCAATACTGAACATTGGGCCACACGGTCCGATGACTTGGCGTG
TCTGAACTGAATCTCGTTGTGGAGAGTTGCTGCCTTTGATAGACCCATGCTGACCACAGCCTGATATT
CCAGAACCTGGAACAGGGACTTTCATTGAACTTGTGCTGCTAAATGTAAATGCCTTCTCAAATGACAGAT
TCCAGTTCCCATTTCAACAGAGTAGGGTGCACTGACAAAGTATAGAAGGTTCTAGGTATCTTAATGTGTGG
ATATTCTTAATTAATACTCATTTTTTTTTTAAATAAAAAATTGTTTCAGCTTTAAAA
```

hsIRT5

SEQ ID NO:108

```
>gi|13787213|ref|NM_012241.2| Homo sapiens sirtuin silent mating type
information regulation 2 homolog 5 (S. cerevisiae) (SIRT5),
transcript variant 1, mRNA
```

```
CCGGAGCGCGTCCGGACACAGCGCCTCTAGGAGAAAGCCTGGAAGGCGCTCCGGGGGTACCCAGAGCTC
TTAGCGGGCCGGCAGCATGTGCGGGGCCAAGTAAATGGAAATGTTTTCTAACATATAAAAACTACAGA
AGAAGAAAATAATTTCTGGATCAAAATTAGAAGTCTGTATTATATTGATGTCTCCAGATTCAAATATATT
AGAAAGCAGCCGTGGAGACAACCATCTTCATTTTGGGAGAAATAACTAAAGCCCGCTCAAGCATTAGAA
CTACAGACAAACCTGTATGCGACCTCTCCAGATTGTCCCAAGTCGATTGATTTCAGCTATATTGTGGC
CTGAAGCCTCCAGCGTCCACACGAAACAGATTGTGCTGAAAATGGCTCGGCCAAGTTCAAGTATGGCAG
ATTTTCGAAAGTTTTTTGCAAAAGCAAAGCACATAGTCATCATCTCAGGAGCTGGTGTAGTGCAGAAAG
TGGTGTTCGACCTTCAGAGGAGCTGGAGGTTATTGGAGAAAATGGCAAGCCAGGACCTGGCGACTCCC
CTGGCCTTTGCCACAAACCCGTCCCGGGTGTGGGAGTTCTACCACTACCGGCGGGAGGTGATGGGGAGCA
AGGAGCCCAACCGCGGCACCGCCATAGCCGAGTGTGAGACCCGGCTGGGCAAGCAGGGCCGGCGAGT
CGTGGTCATCACCCAGAACATCGATGAGCTGCACCGCAAGGCTGGCACCAAGAACCCTTCTGGAGATCCAT
GGTAGCTTATTTAAAACTCGATGTACCTCTTGTGGAGTTGTGGCTGAGAATTACAAGAGTCCAATTTGTC
CAGCTTATCAGGAAAAGGTGCTCCAGAACCTGGAATCAAGATGCCAGCATCCAGTTGAGAACTTCC
CCGGTGTGAAGAGGCAAGGCTGCGGGGGCTTGTCTGCGACCTCACGTGCTGTGGTTTGGAGAAAACCTGGAT
CCTGCCATTCTGGAGGAGTTGACAGAGAGCTCGCCACTGTGATTATGTCTAGTGGTGGGCACTCTCT
CTGTGGTGTACCCAGCAGCCATGTTTGGCCCCAGGTGGCTGCCAGGGGCGTGCCAGTGGCTGAATTTAA
CACGAGACCAACCCAGCTACGAACAGATTGAGTTTCATTTCCAGGGACCCGTGGAAACGACTCTTCCT
GAAGCCCTTGCTGTGATGAAAATGAACTGTTTCTTAAGTGTCTTGGGGAAGAAAGAAATTACAGTATA
TCTAAGAACTAGGCCACACGAGAGGAGAAATGGTCTTATGGGTGGTGAAGTACTGAACAATCTAA
AAATAGCCTCTGATTCCCTCGCTGGAATCCAACCTGTGATAAGTGATGGGGTTTGAAGTAGCAAGA
GCACCCACATTCAAAGTCAAGAACTGGAAGTTAATTCATATTATTTGGTTTGAAGTGAACGTTGAGG
TATCTTTGATGTGTATGGTTGTTTATTTGGGAGGGAATAATTTGTAAATTAGATTGTCTAAAAAAATAG
TTATTCTGATTATATTTTGTATCTGGGCAAGTAGAAGTCAAGGGGTAAAAACCTACTATTCTGATT
TTTGACAAAGTTTTAGTGGAAAATAAAATCACACTCTACAGTAAAAAATAAAAAA
```

```
>gi|13787214|ref|NM_031244.1| Homo sapiens sirtuin silent mating type
information regulation 2 homolog 5 (S. cerevisiae) (SIRT5),
transcript variant 2, mRNA SEQ ID NO:109
```

```
ATTCGGGGGCGGAGCTGCCCCAGTAAATGGAAATGTTTTCTAACATATAAAAACTACAGAAGAAGAAA
ATAATTTTCTGGATCAAAATTAGAAGTCTGTATTATATTGATGTCTCCAGATTCAAATATATTAGAAAGCA
GCCGTGGAGACAACCATCTTCATTTTGGGCGAAATAACTAAAGCCCGCTCAAGCATTAGAACTACAGAC
AAACCTGTATGCGACCTCTCCAGATTGTCCCAAGTCGATTGATTTCAGCTATATTGTGGCCTGAAGCC
TCCAGCGTCCACACGAAACAGATTGTGCTGAAAATGGCTCGGCCAAGTTCAAGTATGGCAGATTTTCGA
AAGTTTTTGTCAAAGCAAAGCACATAGTCATCATCTCAGGAGCTGGTGTAGTGCAGAAAGTGGTGTTC
CGACCTTCAGAGGAGCTGGAGGTTATTGGAGAAAATGGCAAGCCAGGACCTGGCGACTCCCCGGCCTT
```

TGCCACAACCCGTCCTCCGGGTGTGGAGTTCTACCACTACCGCGGGAGGTCATGGGGAGCAAGGAGCCC
AACGCCGGGACCCGCGCCATAGCCGAGTGTGAGACCCGGCTGGGCAAGCAGGGCCGGCGAGTCGTGGTCA
TCACCCAGAACATCGATGAGCTGCACCGCAAGGCTGGCACCAAGAACCTTCTGGAGATCCATGGTAGCTT
ATTTAAACTCGATGTACCTCTTGTGGAGTTGTGGCTGAGAATTACAAGAGTCCAATTTGTCCAGCTTTA
TCAGGAAAAGGTGCTCCAGAACCTGGAACTCAAGATGCCAGCATCCCAGTTGAGAAACTTCCCCGGTGTG
AAGAGGCAGGCTGCGGGGGCTTGTGCGACCTCAGTCGTGTGGTTTGGAGAAAACCTGGATCCTGCCAT
TCTGGAGGAGGTTGACAGAGAGCTCGCCCACTGTGATTTATGTCTAGTGGTGGGCACTTCTCTGTGGTG
TACCCAGCAGCCATGTTTGGCCCCCAGGTGGCTGCCAGGGGCGTGCCAGTGGCTGAATTTAACACGGAGA
CCACCCAGCTACGAACAGATTCACTCATTTGATCTCCATCTCATCTCTAATTATTATAAAGAAATTA
CAAGTCATCATTTGTAGAAAAGCAAGAAAATGCAGATAGAGAAAAGAAGAAAATAAACTGGAGTATTTT
CACAACCCCAAGTTTAGAGTTGGCCCCCACCCTCCCATGCCATGGACTGAGCAGCAGGGGGCCAGCATCCCT
TGGATATGGTGGCTGTGTCTTCATGTGAAAGAAAAGTGAACCTTGGTGGTTTTCTGCGCAGTTTCAAGAGAG
ATTCTTGGCATGTAATATATATCACTGCTCAAGTCAAGCCTCTAAAACACAGACCTGTTTCAGCTGCT
ACTTCAGCCAAAATTCTTCAGCTTCATATTGTCTTGAAGAACCTATGATTGTCTCTAACAAACAGGCTACT
TGCTAGTTAGAAATCTTATCAATTTGGCAAGCTACTTATCAACCAGACTGACCACAAGAACTGTCACTT
CATCAATGAAGGAGTAAGTATGATCAATGAAGCCAGCAATGCTTTTTTCTTGGCATCATCAAGCTGCACAT
TAGAAGAGATGCTGGTGATAGTCACTCATCTCACTCAATTTTTCAAAGGCAGAAACCAACCTGGAGCA
ATTGAGAGGACTGTTTAAACACAGAGCTTAACAATGGCAGAATTGTATATCTCGTGCCTAACAGATTTTG
GTTGAACCTTACCCTAGGTGAGGGGTGAGCAAACTACTGCTGTGGGGCAAATTTGCCCAACCACTGTAT
CTGTAAATAAGGTTTCATTGGAACACAGCTGTGGCCATATGTTTGTATATTGTGTGTGGCTGCTTTTGCA
TTAGGATGACAGAGGTGAATAGTTGCAACAGAGACTGGCTGGTCTGCAAGGCCTAAAATATGTCCTGTGT
GGCCCTTTACAGAAAAGTTTTCTAACCCCTGCTCTAGGTTACGGAGAAAAAAATGGAATAATGTTCT
CTGTACTTTTAACTGATTTTCTTTGTACCTAAATAGGCAGCTAGAATGCTGCCTATATTTTAATAAGG
ATTTGGATCTCACAAGACACCTTAGCGCTACACAAGTTGTTAGATTCTTTGCCCCAGTTCTAATCTAGT
GACAAAGGCATAGAATCTCTCCACAGGAATGATTTCTATTTTCAAGGTGTTAATTAGTTCAGTTT
TGGTTTGTGCTTTTCCCATGTCCGATGCTTATGATGATTTCTGATAAACCTGACTATTCCAATA
AACCCTAGGCATTTTTGAATTTAAAAA

hsIRT6

SEQ ID NO:110

>gi|7706709|ref|NM_016539.1| Homo sapiens sirtuin silent mating type
information regulation 2 homolog 6 (S. cerevisiae) (SIRT6), mRNA

GCTTCCGGCGGAAGCGGCCCTCAACAAGGGAACTTTATGTTCCCGTGGGGCAGTCGAGGATGTCGGTGA
ATTACGCGGCGGGGCTGTGCGCGTACGCGGACAAGGGCAAGTGCAGGCTCCCGGAGATCTTCGACCCCC
GGAGGAGCTGGAGCGGAAGGTGTGGGAAGTGGCGAGGCTGGTCTGGCAGTCTTCCAGTGTGGTGTTCAC
ACGGGTGCCGGCATCAGCACTGCCTCTGGCATCCCGACTTCAGGGGTCCCCACGAGTCTGGACCATGG
AGGAGCGAGGTCTGGCCCCAAGTTGACACCACTTTGAGAGCGCGCGGCCACGCAGACCCACATGGC
GCTGGTGAGCTGGAGCGCTGGGCCCTCTCCGCTTCTGGTGCAGCCAGAACGTTGACCGGGCTCCATGTG
CGCTCAGGCTTCCCCAGGGACAACTGGCAGAGCTCCACGGGAACATGTTTGTGGAAGAATGTGCCAAGT
GTAAGACGCAGTACGTCAGACACAGTCGTGGGCACCATGGGCCTGAAGGCCACGGGCGGGCTCTGCAC
CGTGGCTAAGGCAAGGGGCTGCGAGCCTGCAGGGGAGAGCTGAGGGACACCATCTAGACTGGGAGGAC
TCCCTGCCGACCGGGACCTGGCACTGCGCGATGAGGCCAGCAGGAACGCCGACCTGTCCATCAGCTGG
GTACATCGCTGCAGATCCGGGCCAGCGGGAACCTGCGGCTGGCTACCAAGCGCCGGGAGGCGCGCTGGT
CATCGTCAACCTGCAGCCCAAGCAGACCGCCATGCTGACCTCCGCATCCATGGCTACGTTGACGAG
GTCATGACCCGGCTCATGAGACACCTGGGGCTGGAGATCCCCGCTGGGACGGCCCCCGTGTGCTGGAGA
GGGCGCTGCCACCCCTGCCCGCGCCGCCACCCCAAGCTGGAGCCCAAGGAGGAATCTCCACCCGGAT
CAACGGCTCTATCCCGCGCGGCCCAAGCAGGAGCCCTGCGCCAGCACACCGGCTCAGAGCCCGCCAGC
CCAAACGGGAGCGGCCACAGCCCTGCCCCCAGACCCCAAGGGTGAAGGCCAAGCGGTCC
CCAGCTGACCAAGGTGCTTGGGGAGGGTGGGGCTTTTGTAGAACTGTGGATTCTTTTCTCTCGTGGT
CTCACTTTGTTACTTGTCTGTCCTCCGGGAGCCTCAGGGCTCTGAGAGCTGTGCTCCAGGCCAGGGGT
ACACCTGCCCTCCGTGGTCCCTCCCTGGGCTCCAGGGGCTCTGGTGCAGTTCCGGGAAGAAGCCACCC
CCAGAGGTGACAGTGCAGCCCTGCCACACCCAGCCTCTGACTTGTGTGTGTTCCAGAGGTGAGGCTG
GGCCCTCCCTGCTCAGCTTAAACAGGAGTGAATCTCTGTCCTCCAGGGCTCCCTCTGGGCCCC
CTACAGCCCAACCTACCCCTCCTCCATGGGCGCTGAGGAGGGGAGACCCACCTTGAAGTGGGGGATCAG
TAGAGGCTTGCACCTGCTTGGGGCTGGAGGGAGAGCTGGGTCCACCAGGCTTCTGAAAAGTCTCTCAAT
GCAATAAAACAATTTCTTTCTTGCAA

hsIRT7

SEQ ID NO:111

>gi|7706711|ref|NM_016538.1| Homo sapiens sirtuin silent mating type information regulation 2 homolog 7 (S. cerevisiae) (SIRT7), mRNA

GCCGAAGCGGAAGAGCAGGTCCTCCAGGGGAGCGATGGCAGCCGGGGGTCTGAGCCGCTCCGAGCGCAAAG
 CGGCGGAGCGGGTCCGGAGGCTTGCGGGAGGAGCAGCAGAGGGAGCGCCTCCGCCAGGTGTGCGGCATCCT
 GAGGAAGGCGGGCGGGAGCGCAGCGCCGAGGAGGGCCGGCTGCTGGCCGAGAGCGCGGACCTGGTAAACG
 GAGCTGCGAGGGGCGGAGCCGGCGGCGCAGGGGCTGAAGCGGCGGAGGAGGTGTGCGACGACCCGG
 AGGAGCTGCGGGGGAAGGTCCGGGAGCTGGCCAGCGCCGTCCGGAACCGCAAATACTTGGTCTGCTACAC
 AGGCGCGGGAATCAGCACGGCAGCGTCTATCCCAGACTACCGGGGCCCTAATGGAGTGTGGACACTGCTT
 CAGAAAGGGAGAAGCGTTAGTGCTGCCGACCTGAGCGAGGCCGAGCCACCTCACCCACATGAGCATCA
 CCGTCTGATGAGCAGGAAGCTGGTGCGAGCATGTGGTGTCTCAGAACTGTGACGGGCTCCACCTGAGGAG
 TGGGCTGCCGCGCAGCGGCATCTCCGAGCTCCACGGGAACATGTACATTGAAGTCTGTACCTCCCTCGGTT
 CCCAACAGGGAGTACGTGCGGGTGTTCGATGTGACGGAGCGACTGCGCTCCACAGACACCGACGAGCC
 GGACCTGCCACAAGTGTGGGACCCAGCTGCGGGACACCATTGTGCACTTTGGGGAGAGGGGGACGTTGGG
 GCAGCCTCTGAACCTGGGAAGCGGCGACCGAGGCTGCCAGCAGAGCAGACACCATCCTGTGTCTAGGGTCC
 AGCCTGAAGGTTCTAAAGAAGTACCCACGCTCTGGTGATGACCAAGCCCCCTAGCCGGCGGCCGAAGC
 TTACATCGTGAACCTGAGTGGACGACCCGCAAGGATGACTGGGCTGCCCTGAAGCTACATGGGAAGTGTGA
 TGACGTGATGCGGCTCCTCATGGCCGAGCTGGGCTTGGAGATCCCGCTATAGCAGGTGGCAGGATCCC
 ATTTTCTCACTGGCGACTCCCCTGCGTGCTGGTGAAGAAGGCAGCCACAGTCGGAAGTCGCTGTGCAGAA
 GCAGAGAGGAGGCCCCGCTGGGGACCGGGGTGCACCGCTTAGCTCGGCCCCCATCCTAGGGGGCTGGTT
 TGGCAGGGGCTGCACAAAACGCACAAAAGGAAGAAAGTGACGTAATCACGTGCTCGATGAAGAACAGTT
 GGCACCTTTCAGATGCGCCAGTGACCGGTGAAGGCTGGGTTGCCCCACGGGTCTAGGGAGACGAACTC
 TTTGGGGATGACATTTTACCAGTGACATTTTAGCCATTTGTCTTGAGGAAGCCCTTGACTGCTGCG
 GTTGTACCTGATACGGCCTGGCCATCGAGGACACCTGCCCATCCGGCCTCTGTGTCAAGAGGTGGCAGC
 CGCACCTTTCTGTGAGAACGGAACCTCGGTTATTTCAGCCCCGGCCTGCAGAGTGAAGCGCCAGCGGC
 CTTTCTCGCTCACCGAGCGAGTCTCAGGGCGTCAACGATTATTCTACTACTTAAATGAAAAAGTGTGA
 ACTTTATAGAACTCTCTGTAATCTGATGTGCGGCGAGAGGGGTGGCTCCGAGCCTCGGCTCTATGCAGAC
 CTTTTTATTTCTATTAAACGTTTCTGCACTGGCAAAA

MECP2

SEQ ID NO:112

[illegible]

[illegible]

CAGGAAGCCCACCCAGCCCAGCCACGCAGAGCCAGAAGGAAAGAAAGCCTCATGCCTGAGCCGAGGGGA
 GCACCATGGATCTGACAAAAATGGGCATGATCCAGCTGCAGAACCTAGCCACCCACGGGGCTACTGTG

CAAGGCCAACAGATGCGGCTGGCCGGGACTTTGTGCGATGTGGTCATCATGGTGGACAGCCAGGAGTTC
 CACGCCACCGGACGGTGTGCTGGCCTGCACCAGCAAGATGTTTGAGATCCTCTCCACCGCAATAGTCAAC
 ACTATACTTTGGACTTCCTCTCGCCAAAGACCTTCCAGCAGATTCTGGAGTATGCATATACAGCCACGCT
 GCAAGCCAAGGCGGAGGACCTGGATGACCTGCTGTATGCGGCCGAGATCCTGGAGATCGAGTACCTGGAG
 GAACAGTGCCTGAAGATGCTGGAGACCATCCAGGCCTCAGACGACAATGACACGGAGGCCACCATGGCCG
 ATGGCGGGGGCCGAGGAAGAAGAGGACCGCAAGGCTCGGTACCTCAAGAACATCTTCATCTCGAAGCATT
 CAGCGAGGAGAGTGGGTATGCCAGTGTGGCTGGACAGAGCCTCCCTGGGCCCATGGTGGACCAGAGCCCT
 TCAGTCTCCACTTCATTTGGTCTTTCAGCCATGAGTCCCAAGGCTGCAGTGGACAGTTTGATGACCA
 TAGGACAGTCTCTCCTGCAGGGAACCTCTTCAGCCACCTGCAGGGCCCGAGGAGCCAACTCTGGCTGGGG
 TGGGCGGCACCTTGGGGTGGCTGAGGTGAAGACGGAGATGATGCAGGTGGATGAGGTGCCAGCCAGGAC
 AGCCCTGGGGCAGCCGAGTCCAGCATCTCAGGAGGGATGGGGGACAAGGTTGAGGAAAAGAGGCAAGAGG
 GGCCTGGGACCCCGACTCGAAGCAGCGTCATCACCAGTGTAGGGAGCTACACTATGGGCGAGAGGAGAG
 TGCCGAGCAGGTGCCACCCCGAGTGTAGGCTGGCCAGGCCCCCACTGGCCGACCTGAGCACCCAGCACCC
 CGGCTGAGAAGCATCTGGGCATCTACTCCGTGTTGCCCAACCACAAGGCTGACGCTGTATTGAGCATGC
 CGTCTTCGTGACTCTGGCCTCCAGCTGCAGCTGCCCTGGCTGTCTCCATGGACTTCAGCACCTATGG
 GGGGCTGCTGCCCCAGGGCTTCATCCAGAGGGAGCTGTTAGCAAGCTGGGGGAGCTGGCTGTGGGCATG
 AAGTCAGAGAGCCCGACCATCGGAGAGCAGTGCAGCGTGTGTGGGGTGCAGCTTCTGATAACGAGGCTG
 TGGAGCAGCAGGAAGCTGCACAGTGGGATGAAGACGTACGGGTGCGAGCTCTGCGGGAAGCGGTTCTCT
 GGATAGTTTGGCGCTGAGAATGCACTTACTGGCTCATTCAGCGGGTGCCAAAGCCTTTGTCTGTGATCAG
 TGCGGTGCACAGTTTTCGAAGGAGGATGCCCTGGAGACACACAGGCAGACCATACTGGCACTGACATGG
 CCGTCTTCTGTGTGTGGGAAGCGCTTCAGGCGCAGAGCGCACTGCAGCAGCACATGGAGTCCCA
 CGCGGGCGTGCAGCTACATCTGCAGTGTGAGTGCACCGCACCTTCCCCAGCCACAGGCTCTCAAACGC
 CACCTGCGCTCACATACAGGCGACACCCCTACGAGTGTGAGTTCTGTGGCAGCTGCTTCCGGGATGAGA
 GCACACTCAAGAGCCACAAACGATCCACACGGGTGAGAAACCTACGAGTGCATGGCTGTGACAAGAA
 GTTCAGCCTCAAGCATCAGCTGGAGACGCACTATAGGGTGACACAGGTGAGAAGCCCTTTGAGTGTAA
 CTCTGCCACGCGCTCCCGGACTACTCGGCCATGATCAAGCACCTGAGAAGCACAACGGCGCCTCGC
 CCTACCAGTGCACCATCTGCACAGAGTACTGCCCCAGCCTCTCTCCATGCAGAAGCACATGAAGGCCA
 CAAGCCCGAGGAGATCCCGCCGACTGGAGGATAGAGAAGACGTACCTCTACCTGTGCTATGTGTGAAGG
 GAGGCCCGCGCGGTGGAGCCGAGCGGGGAGCCAGGAAGAAGAGTTGGAGTGAGATGAAGGAAGGACTA

TFDP1

SEQ ID NO:114

>gi|6005899|ref|NM_007111.1| Homo sapiens transcription factor Dp-1 (TFDP1), mRNA

GGAATCCGTAGCTATTGATTTCCCGGATCTGGTAACATGGCAAAAGATGCCGGTCTAATTGAAGCCAAAC
 GGAGAACTCAAGGTCTTCATAGACCAGAACCTTAGTCCCGGGAAGGCGTGGTGTCCCTCGTGGCCGTTTC
 ACCCTCCACCGTCAACCCGCTCGGGAAGCAGCTCTTGCCAAAACCTTTGGACAGTCCAATGTCAACAT
 TGCCAGCAAGTGGTAATGGTACGCTCAGAGACCGGCAGCGTCAAACACCCTGGTGGTAGGAAGCCCA
 CACACCCCGAGCACTCACTTTGCCTCTCAGAACCAGCCTTCCGACTCCTCACTTGGTCTGCCGGAAGC
 GCAACAGGAAGGAGAGAGAAGATGGCAAGGGCCTACGGCATTCTCCATGAAGGTCTGCGAGAAGGTGCA
 GAGGAAAGGGACCATTCTACAACGAAGTGGCAGACGAGCTGGTTGCGGAGTTCAAGTGTGCCGACAAC
 CACATCTTACCAACGAGTCAGCTTATGACCAGAAAAACATAAGACGGCGCTCTACGATGCCTTAAACG
 TGCTAATGGCCATGAACATCATCTCCAAGGAGAAGAAGGAGATCAAGTGGATTGGTCTGCCACCAACTC
 GGCTCAGGAATGTGAGAACTTAGAGGTGGAAGACAGAGGAGACTTGAAGAATAAAACAGAAACAGTCT
 CAACTTCAAGAACTTATTCTACAGCAAATTGCCCTCAAGAACCTGGTGCAGAGAAACCGGCATGCCGAGC
 AGCAGGCCAGCCGGCCACCGCCACCAACTCAGTCATCCACCTGCCCTTATCATCGTCAACACCAGCAA
 GAAGACGGTCATCGACTGCAGCATCTCCAATGACAAATTTGAGTATCTGTTAATTTTGACAACACATTT
 GAAATCCACGATGACATAGAAGTGTGAAGCGGATGGGCATGGCTTGGGGCTGGAGTGGGGGAGCTGCT
 CTGCCGAAGACCTTAAATGGCCAGAAGTCTGGTCCCCAAGGCTCTGGAGCCATACGTGACAGAAATGGC
 TCAGGGAACCTGTTGGAGGCGTGTTCATCACGACGGCAGGTTCCACGTCTAACGGCACAAGGTTCTCTGCC
 AGTGACCTGACCAACGGTGCAGATGGGATGCTGCCACAAGCTCCAATGGTCTCAGTACAGCGGCTCCA
 GGGTGGAGACTCCGTTGCTACGTGCGGGAGGACAGGAGGACGATGACTTCAACGAGAATGACGA
 GGAGGACTGACGTCTCCCACTTCAGATTCCGGCTCAGGAAAACGTTTAGCGAAAAGAACTTTTTTTT
 TAATGGGGTTTTCTGTTTTGCGCTAGTCCCAAGAAGATATTGGTAAGCTATTGAATTTAGATAT
 GCACCTCTGATAAGCAAGGATTGTTTCCCGTAGATTAGGA

SAP30

SEQ ID NO:115

>gi|4506782|ref|NM_003864.1| Homo sapiens sin3-associated polypeptide, 30kD (SAP30), mRNA

CCCCATGTGACAGTGACGGGGTCCCCGCTCCAGGAGACGCTCGAGTCTGCGTCCCGGCCCTCAGCACTG
TCCACTGTTTTCGGTGCCAGCAGAGACCAGCAGGCCCGGGACAGTTGGTGTGGCCGTGCCGCTGTCTAA
CTTGGTGTGACAGTGAATTGCCGCTGCCGAGCGGAGAGAGGCGGAGCGGCCAGGAGAGAGGGGATTTC
TGTCAGCGCCGCCCTCGGGAGCTCGGAGACATGAACGGCTTCACGCCTGACGAGATGAGCCGCGGGGG
ATGCGGCCCGCCGAGTGGCCGAGTGGTGGCTGCCGCGGGCCGCCCGCCTCGGCGGGGAACGGGACCGG
CGCGGGCACCGGGGCTGAGGTGCCGGGCGCGGGGCGGTCTCAGCGGCTGGGCCCGGGGGCGGCCGGG
CCGGGCCCGGGCAACTGTGCTGCCGCGGAGGATGGTGAGCGGTGCGGCCGGGCGGCAGGCAACGCCA
GCTTCAGCAAGAGGATCCAGAAGAGCATCTCCAGAAGAAGGTGAAGATCGAGCTGGATAAGAGCGCAAG
GCATCTTTACATATGTGATTATCATAAACTTAATTACAGAGTGTTCGAAACAGAAGAAAGAGAAAAGGG
AGTGATGATGATGGAGGTGATTACCTGTTCAAGATATTGATACCCAGAGGTTGATTTATACCAATTAC
AAGTAAATACACTTAGGAGATACAAAGACACTTCAAGCTACCAACCAGACCAGGACTTAATAAAGCACA
ACTTGTAGAGTAGTTGGTTGCCACTTTAGGTCTATTCCAGTGAATGAAAAAGACACCTTAACATATTTT
ATCTACTCAGTGAAGATGACAAGAACAATCAGATCTCAAGGTTGATAGTGGTGTTCAGTGGAGACGT
GGAATTGAGACTAATAACTTGGATGTTAACTGTTTACTGTTTTTTCATGTAGAAATGTTCTTTGTG
TATTTTTTCTACAGAGGATTTTCTCTGATTTATTTTCTTTGTTTCTGACTCTAATAATTAGTTGGAAAC
TCATATAAATGAGCTTTCCTAAATTAAATCTATTTTAAATAAAGGTTATTACTATTAATAAAAAAAAAA
AAAAA

SAP18

SEQ ID NO:116

>gi|12056471|ref|NM_005870.2| Homo sapiens sin3-associated polypeptide, 18kD (SAP18), mRNA

AGGTTTGAAGTACTTATTATTTTGTAAATGTGAATTTTACAAAGCGCTTTACAATTAATGATCACATC
CTTTTGTGTTGTCATGGATTTCCTACTGTCTGAAACGGCTCTGAGCACGCTTGAAGCCCTCGGTTTCCCTGT
TCGCTTTTGAATGTTTCAGTTTTAGTTATTGATACAATGTCAGCCATGGCTAAAAAGTAACAGTCTTGAC
TCTACCGAGTAACAGCACAAAAACAGAGTGAGGGCTCAGGAAAACAAAACAAAGGCTTCCTCTTAAAAA
AAAGACAAAAAAGCTAAGCATCTGTGGCTGAAATCTAACTCAGTGGTACTGTGAAACCTTCCTTT
ACAGCACAGGAAATTTATTTTAAACAGTCTGTGAGTTACAGTACTTTAACCCCTAACAGACTCTTTAA
AACAAACCGTCTCCTTTTAAAGTCTCTTTTCCAAACATTCCATCCGAAGGATGGATGCTACTTTGC
ACCCAGTGCCATCCAAATGTTCAAGTCAAAAATATTTATACATTTTATACTTAGGCGAGCGTCTCGCAGG
CCGTAGGAGGAAGATGGCGGTGGAGTCGCGCGTTACCCAGGAGGAATTAAGAAGGAGCCAGAGAAACCG
ATCGACCGCGAGAAGACATGCCCACTGTTGCTACGGGTCTTCACCACCAATAACGGCCGCCACCACCGAA
TGGACGAGTTCTCCCGGGGAAATGTACCGTCCAGCGAGTTGCAGATCTACACTTGGATGGATGCACTTT
GAAAGAAGTACAAAGCTTAGTAAAGAAGTCTACCCAGAAGCTAGAAAGAAGGGCACTCACTTCAATTTT
GCAATCGTTTTTACAGATGTTAAAGACCTGGCTATCGAGTTAAGGAGATTGGCAGCACCATGTCTGGCA
GAAAGGGGACTGATGATTCCATGACCCTGCAGTCGCAGAAGTTCCAGATAGGAGATTACTTGCATAGC
AATTACCCCTCCAAATCGGGCACCACCTCCTTCAGGGCGCATGAGACCATTAATTAATTCTATTACTATT
TGTTGAATTTATTTTCCGTCAAGTTATGTAAATTAACATACTCTTCTTCCCTCGATTTATGTCATT
AAGCCTTTAAATTTCTAAACAAATTATAATGCATCATCTATTAGGAGTTAGATTGGATGTGCTATTGTA
TGATTACGAATAGTCTGTATGTTTCAAGCCCTTCTGTAATAATGAAGAAAAGTCTCTTAGCATCTGTG
TAAACTGTACTGTTAAATATATGTGTGTAATC

RBBP7

SEQ ID NO:117

>gi|13259504|ref|NM_002893.2| Homo sapiens retinoblastoma binding protein 7 (RBBP7), mRNA

GCCTCGTCAGCTGCCTGGGCGGGCTGGGAGGCGCGGGTTGAAAGTCTCGTTCCAAGTTTGGAGAGAGAG
AGAAGAGCGCCTCAGACCTCGGTACCGCGAGCGGGGAGGAGGCAGAAAGAAGGACGCGGCTCTGGGG
AGCACCAGGCAGCAAGACGGGGCCCGGGCTTTCGACAGTGGGGAGTGTGACGCGCTTGGGAAAGGCAGG
AGCGCCAGCGGTGCGGCTGCTCTTGGCTAACGAGAGGAGTCCGAGGCGGCGGCGAGGGCGAAGCAGCCG
ACGCAAGATGGCGAGTAAAGAGATGTTTGAAGATACCTGTGGAGGAGCGGTGTCATCAATGAAGAATATAAA
ATCTGGAAGAAGAATACACCGTTTCTATATGACCTGGTTATGACCCATGCTCTTCAGTGGCCAGTCTTA
CCGTTCAAGTGGCTTCTGAAAGTACTAACTGAAGGAAAAGATTATGCCCTTCATTGGCTAGTGCTGGG
GACTCATACGTTGATGAGCAGAATCATCTGGTGGTTGCTCGAGTACATATTCCCAATGATGATGCACAG
TTTGATGCTTCCCATGTGACAGTGACAAGGGTGAATTTGGTGGCTTGGTTCTGTACAGGAAAATTG

AATGTGAAATTTAAATCAATCACGAAGGAGAAGTAAACCGTGTCTGTTACATGCCGAGAAATCCTCACAT
CATTGCTACAAAAACACCATCTTCTGATGTGTTGGTTTTTACTATACAAAAACCCCTGCTAAACCAGAC
CCAAGTGGAGAAATGTAATCCTGATCTCAGATTAAGAGGTCACCAGAAGGAAGGCTATGGTCTCTCCTGGA
ATTCAAATTTGAGTGGACATCTCCTAAGTGCATCTGATGACCATACTGTTTGTCTGTGGGATATAAACGC
AGGACCAAAAGAAGGCAAAATTGTGGATGCTAAAGCCATCTTTACTGGCCACTCAGCTGTTGTAGAGGAT
GTGGCCTGGCACCTGCTGCACGAGTCATGTTTGGATCTGTTGCTGATGATCAGAAACTTATGATATGGG
ACACCAGGTCCAATACCACCTCCAAGCCGAGTCACTTGGTGGATGCGCACACTGCCGAAGTCAACTGCCT
CTCATTCAATCCCTACAGCGAATTTATTCTAGCCACCGGCTCTGCGGATAAGACCGTAGCTTTATGGGAT
CTGCGTAACCTTAAAAATTAAAACTCCATACCTTCGAATCTCATAAAGATGAAATTTTCCAGGTCCACTGGT
CTCCACATAATGAACTATTCTGGCTTCAAGTGGTACTGACCGCCGCTGAATGTGTGGGATTTAAGTAA
AATTGGGGGAAGACAATCAGCAGAAGATGCAGAAGATGGGCCCTCAGAACTCCTGTTTATTTCATGGAGGA
CACACTGCTAAGATTTTCAGATTTTAGCTGGAACCCCAATGAGCCTTGGGTCAATTTGCTCAGTGTCTGAGG
ATAACATCATGCAGATATGGCAAATGGCTGAAAATATTTACAATGATGAAGAGTCAGATGTCACGACATC
CGAACTGGAGGGACAAGGATCTTAAACCCAAAGTACGAGAAAATGTTTCTGTTGAATGTAATGCTACATGA
ATGCTTGATTTATCAAGCGCCAAAAGGCATTGTATAGTAGGAAAATGTAAGTGGGGTGGCTTATGGCTTC
TTTATCCTCTGATTTAGCACTTTCAAGTGAGCTGTTGCGTACTGTATCATATTGTAGCTATTAGGGAAG
AGAAGAATGTTGCTTAAGAAAGAACATCACCATTGATTTTAAATACAAGTAGCAGGGTATTGCCTTTGAT
TCAACTGTTTAAAGTCCTCATTTTCTCAAACCTAAGTGCTTGCTGTTCCCAAATATGCAAGAATAACTTTT
ACACTTTTTCCTTCCAACACTTCTTGATTGGCTTTGCAGAAAATAAGTTTTTAAAT
RBBP4
SEQ ID NO:118
>gi 5032026 ref NM_005610.1 Homo sapiens retinoblastoma binding
protein 4 (RBBP4), mRNA
CGCGCGCACAGAGCGAGCTCTTGCAGCCTCCCCGCCCCCTCCCGCAACGCTCGACCCAGGATTCCCCCGG
CTCGCCTGCCCGCCATGGCCGACAAAGGAGCAGCCTTCGACGACGAGTGGGAAGAACGAGTGATCAACGA
GGAATACAAAATATGGAAAAAGAACACCCCTTTTCTTTATGATTTGGTGATGACCCATGCTCTGGAGTGG
CCCAGCCTAACTGCCAGTGGCTTCCAGATGTAAACGACACAGGAGGAAAGATTTCAGCATTTCATCGAC
TTGTCTGGGGACACACACATCGGATGAACAAAACCATCTTGTTATAGCCAGTGTGCAGCTCCCTAATGA
TGATGCTCAGTTTGATGCGTCACACTACGACAGTGAGAAAGGAGAATTTGGAGGTTTTGGTTTCAGTTAGT
GGAAAAATTGAAATAGAAATCAAGATCAACCATGAAGGAGAAAGTAAACAGGGCCCGTTATATGCCCCAGA
ACCTTGTATCATCGCAACAAAGACTCCTTCCAGTGATGTTCTTGTCTTTGACTATACAAAACATCCTTC
TAAACAGATCCTTCTGGAGAGTGCAACCCAGACTTGGCTCTCCGTGGACATCAGAAAGGAAGGCTATGGG
CTTTCTTGAACCCCAATCTCAGTGGGCACCTTACTTAGTGCTTCAGATGACCATACCATCTGCCTGTGGG
ACATCAGTGCCGTTCCAAAGGAGGGAAGAGTGGTAGATGCGAAGACCATCTTACAGGGCATAACGGCAGT
AGTAGAAGATGTTTCTGGCATCTACTCCATGAGTCTCTGTTTGGGTGAGTTGCTGATGATCAGAACTT
ATGATTTGGGATACCTCGTTCAAACAATACTTCAAACCAAGCCACTCAGTTGATGCTCACACTGCTGAAG
TGAACCTGCCTTCTTTCAATCCTTATAGTGAGTTGATCTTGTGCCACAGGATCAGCTGACAAAGACTTGTG
CTTGTGGGATCTGAGAAATCTGAACTTAAGTTGCATTCTTTGAGTCACATAAGGATGAAATATTCCAG
GTTCACTGGTCACTCACAATGAGACTATTTTAGCTTCCAGTGGTACTGATCGCAGACTGAATGTCTGGG
ATTTAAGTAAAATTGGAGAGGAACAATCCCCAGAAGATGCAGAAGACGGGCCACCAGAGTTGTTGTTTAT
TCATGGTGGTCATACTGCCAAGATATCTGATTTCTCCTGGAATCCCAATGAACCTTGGGTGATTTGTTCT
GTATCAGAAGACAATATCATGCAAGTGTGGCAAATGGCAGAGAACATTTATAATGATGAAGACCCCTGAAG
GAAGCGTGGATCCAGAAGGACAAGGGTCTAGATATGCTTTACTTGTGTGATTTTAGACTCCCCTTTT
TTCTTCTCAACCCCTGAGAGTGATTTAACTGGTTTTGAGACAGACTTTATTCAGCTATCCCTCTATATA
ATAGGTACCACCGATAATGCTATTAGCCCAAACCGTGGGTTTTTCTAAATATTAATAGGGGGGCTTGATT
CAACAAAGCCACAGACTTAACGTTGAAATTTTCTTCAGGAATTTCTAGTAACCCAGGTCTAAAGTAGCT
ACAGAAAGGGGAATATTATGTGTGATTATTTTCTTCTATGCTATATCCCCAAGTTTTTCAGACTCATT
TAAGTAAAGGCTAGAGTGAGTAAGGAATAGAGCCAAATGAGGTAGGTGCTGAGCCATGAAGTATAAATA
CTGAAAGATGTCACTTTTATTCAGGAATAGGGGGAGTTCAAGTCGTATAGATTCTTACTCGAAAATCTT
GACACCTGACTTTCCAGGATGCACATTTTCATACGTAGACCAGTTTCTCTTGGTTTCTTCAGTTAAGTC
AAAACAACACGTTCTCTCTTTCCCATATATTCATATATTTTGTCTCGTTAGTGTATTTCTTGAGCTGTTT
TCATGTTGTTTATTTCTGTCTGTGAAATGGTGTTTTTTTTTTTGTGTTGTTGTTTTTTTTTTTTTTT
AACTTGGGACCACCAAGTTGTAAAGATGTATGTTTTTAACTGACAGTTATACCACAGGTAGACTGTCAAG
TTGAGAAGAGTGAATCAATACTTGTATTTGTTTTAAAAATTAAATTAATCCTTGATAAGAGTTGCTTTT
TTTTTTTAGGAGTTAGTCCTTGACCACTAGTTTGATGCCATCTCCATTTTGGGTGACCTGTTTCACCAGC
AGGCCTGTTACTCTCATGACTAACTGTGTAAGTGCTTAAATGGAATAAATTGCTTTTCTACATAAAAA
AAAA

RB1

SEQ ID NO:119

gi|4506434|ref|NM_000321.1| Homo sapiens retinoblastoma 1 (including osteosarcoma) (RB1), mRNA

TTCCGGTTTTTCTCAGGGGACGTTGAAATTATTTTGTAAACGGGAGTCGGGAGAGGACGGGGCGTGCCTCC
 GCGTGCAGCGCGCTCGTCCCTCCCGCGCTCCCTCCACAGCTCGCTGGCTCCCGCCGCGGAAAGCGCTCAT
 GCCGCCCAAAACCCCCCGAAAAACGGCCGCCACCGCCGCGCTGCCGCGCGGAAACCCCCGCGCACCGCCG
 CCGCCGCCCCCTCCTGAGGAGGACCCAGAGCAGGACAGCGGCCCGGAGGACCTGCCTCTCGTCAGGCTTG
 AGTTTGAAGAAACAGAAGAACCTGATTTTACTGCATTATGTCAGAAATTAAAGATACCAGATCATGTTCAG
 AGAGAGAGCTTGGTTAACTTGGGAGAAAGTTTCATCTGTGGATGGAGTATTGGGAGGTTATATTCAAAG
 AAAAAGGAAGTGTGGGAATCTGTATCTTTATGACAGAGTTGACCTAGATGAGATGTCGTTCACTTTAC
 TGAGCTACAGAAAAACATACGAAATCAGTGTCCATAAATTCTTTAACTTACTAAAAGAAATTGATACCAG
 TACCAAAGTTGATAATGCTATGTCAAGACTGTTGAAGAAGTATGATGATGTTTGCACCTCTTCAGCAAA
 TTGGAAAGGACATGTGAACCTTATATATTTGACACAACCCAGCAGTTCGATATCTACTGAAATAAATTCTG
 CATTGGTGCTAAAAGTTTCTTGGATCACATTTTATTAGCTAAAGGGGAAGTATTACAAATGGAAGATGA
 TCTGGTGATTTTCACTTTCAGTTAATGCTATGTGCTTGAATTTTATTAACTCTCACCTCCACTGTTG
 CTCAAAGAACCATATAAAACAGCTGTTATACCCATTAATGGTTCACCTCGAACACCCAGGCGAGGTCAGA
 ACAGGAGTGCACGGATAGCAAAACAAGTAGAAAATGATACAAGAATTATTGAAGTTCTCTGTAAGAACA
 TGAATGTAATATAGATGAGGTGAAAAATGTTTATTTCAAATAATTTATACCTTTTATGAATTTCTTGGGA
 CTGTGAACATCTAATGGACTTCCAGAGTTGAAAATCTTCTAAACGATACGAAGAATTTATCTTAAAA
 ATAAAGATCTAGATCGAAGATTATTTTGGATCATGATAAAACTCTTCAGACTGATTTCTATAGACAGTTT
 TGAACACAGAGAACCACGAAAAAGTAACCTTGATGAAGAGGTGAATATAATTCTCCACACACTCCA
 GTTAGGACTGTTATGAACACTATCCAACAATTAATGATGATTTTAAATCTGCAAGTGATCAACCTTCAG
 AAAATCTGATTTCTTATTTTAACTGACAGTGAATCCAAAAGAAAGTATACTGAAAAGAGTGAAGGA
 TATAGGATACATCTTTAAAGAGAAATTTGCTAAAGCTGTGGGACAGGGTTGTGTGCAAAATTGGATCACAG
 CGATACAAACTTGGAGTTTCGTTGTATTACCGAGTAATGGAATCCATGCTTAAATCAGAAGAAGACGAT
 TATCCATTCAAATTTTAGCAAACTTCTGAATGACAACTTTTTCATATGTCTTTATTGGCGTGCGCTCT
 TGAGGTTGTAATGGCCACATATAGCAGAAGTACATCTCAGAATCTTGATTTCTGGAACAGATTTGTCTTTC
 CCATGGATTCTGAATGTGCTTAATTTAAAGCCTTTGATTTTACAAAGTGATCGAAAGTTTATCAAAG
 CAGAAGGCAACTTGACAAGAGAAATGATAAAACATTTAGAACGATGTGAACATCGAATCTGGAATCCCT
 TGCATGGCTCTCAGATTCAGCTTTATTTGATCTTATTAAACAATCAAAGGACCGAGAAGGACCACTGAT
 CACCTTGAATCTGCTTGTCTCTTAATCTTCTCTCCAGAATAATCACACTGCAGCAGATATGTATCTTT
 CTCTGTAAAGATCTCCAAAGAAAAAGGTTCAACTACGCGTGTAATTTCTACTGCAATGCAGAGACACA
 AGCAACCTCAGCCTTCCAGACCCAGAAGCCATTGAAATCTACCTCTCTTCACTGTTTTATAAAAAAGTG
 TATCGGCTATCTCCGGCTAAATACACTTTGTGAACGCCTTCTGTCTGAGCACCAGAAATTAGAAG
 ATATCATCTGGACCTTTTCCAGCACACCTTGCAAGATGAGTATGAATCATGAGAGACAGGCATTGGGA
 CCAATTATGATGTGTTCCATGTATGGCATATGCAAGTGAAGAATATAGACCTTAAATTCAAATCATT
 GTAACAGCATACAAGGATCTTCTCATGTGTTTCAGGAGACATTCAAACGTGTTTTGATCAAGAAGAGG
 AGTATGATTCTATTATAGTATTCTATACTCGGTCTTCATGCAGAGACTGAAAACAAATATTTTGCAGTA
 TGCTTCCACCAGGCCCTTACCTTGTCCCAATACCTCACATTCCTCGAAGCCCTTACAAGTTTCTTAGT
 TCACCCTTACGGATTCTCGAGGGAACATCTATATTTCAACCCTGAAGAGTCCATATAAAATTTTCAGAAG
 GTCTGCCAACACCAACAAAATGACTCCAAGATCAAGAATCTTAGTATCAATTGGTGAATCATTCGGGAC
 TTCTGAGAAGTTCCAGAAAATAAATCAGATGGTATGTAAACAGCGACCGTGTGCTCAAAGAAGTGCTGAA
 GGAAGCAACCTCTTAAACCACTGAAAAAACTACGCTTTGATATTGAAGGATCAGATGAAGCAGATGGAA
 GTAAACATCTCCAGGAGAGTCCAAATTTGAGCAGAAACTGGCAGAAATGACTTCTACTCGAACAGGAAT
 GCAAAAGCAGAAAATGAATGATAGCATGGATACCTCAAACAAGGAAGAGAAATGAGGATCTCAGGACCTT
 GGTGGACACTGTGTACACCTCTGGATTCTGTCTCTCACAGATGTGACTGTATAACTTTCCAGGTTCT
 GTTTATGGCCACATTTAATATCTTCAGCTCTTTTGTGGATATAAATGTGCAGATGCAATGTTTGGGT
 GAGTCTTAAGCCACTTGAAATGTTAGTCAATGTTTATTATACAAGATTGAAAATCTTGTGTAATCTCTGC
 CATTTAAAAAGTTGTAGCAGATTGTTTCTCTTCCAAAGTAAAAATTGCTGTGCTTTATGGATAGTAAGAA
 TGGCCCTAGAGTGGGAGTCTGATAACCCAGGCCTGTCTGACTACTTTGCCTTCTTTTGTAGCATATAGG
 TGATGTTTGTCTCTTGTTTTATTAAATTTATATGATATTTTAAATTTAACATGAACACCCTTAGAAAA
 TGTGTCCTATCTATCTTCCAAATGCAATTTGATTGACTGCCCATTCACCAAAATTATCCGAACTCTTCT
 GCAAAAATGGATATTATTAGAAATTAGAAAAAAATTTACTAATTTTACACATTAGATTTTATTCTACTATT
 GGAATCTGATATCTGTGCTGTTTATAAAATTTTGGCTTTAATTAATAAAAGCTGGAAGCAAGT
 ATAACCATATGATACTATCATACTACTGAAACAGATTTTATACCTCAGAATGTAAAAGAACTTACTGATT
 ATTTTCTTCATCCAACCTATGTTTTTAAATGAGGATTATTGATAGTACTCTTGGTTTTTATACCATTTCAG
 ATCACTGAATTTATAAAGTACCCATCTAGTACTTGAAGAAAGTAAAGTGTCTGCCAGATCTTAGGTATAG
 AGGACCCTAACACAGTATATCCCAAGTGCACCTTCTAATGTTTCTGGGTCTGAAGAATTAAGATACAAA
 TTAATTTTACTCCATAAACAGACTGTTAATTATAGGAGCCTTAATTTTTTTTCATAGAGATTTGTCTAA
 TTGCATCTCAAAATTTATCTGCCCTCTTAATTTGGGAAGGTTTGTGTTTTCTCTGGAAATGGTACATGTC
 TTCCATGTATCTTTTGAAGTGGCAATTTGTCTATTTATCTTTTATTTTAAAGTCAGTATGGTCTAACAC
 TGGCATGTTCAAAGCCACATTATTTCTAGTCCAAAATTACAAGTAATCAAGGGTCATTATGGGTTAGGCA

MEN1

SEQ ID NO:120

GGTGTCGGGAGCCGCGGACCTAGAGATCCCAGAAGCCACAGCGCAGCGGCCCGGCCACTATTTTCCA
GGCTCTGCGGGGCAGGGGCCGCGCCACC GCCCGCCGCATGGGGCTGAAGGCCGCCAGAAAGCGCTG
TTCCCGCTGCGCTCCATCGACGACGTGGTGCGCCTGTTTGCTGCCAGCTGGGCCGAGAGAGCCGGACC
TGGTGCTCTTCTTCTGGGTCTCGGTGGAGCAATTTCTGGCTGTCAACCGCGCTCATCCCTACCAA
CGTTCGGGAGCTCACTTCCAGCCAGCCCGCCCCGACCCCGCTGGCGGCTCACTACTTCTCCGCTG
GCCGACCTGTCTATCATCGCCGCCCTCTATGCCCGCTTACC CGCCAGATCCGAGGCGCCGTCGACGCTGT
CCCTCTATCCTCGAGAAGGGGGTGTCTCCAGCCGTGAGCTGGTGAAGAAGGTCTCCGATGT CATATGGAA
CAGCCTCAGCCGCTCCTACTTCAAGGATCGGGCCCA CATCCAGTCCCTCTT CAGCTTCATCAGGCACC
AAATTGGACAGTCCGGTGTGGCCCTTGTCTGTGGTGTGGGGCTGCCAGGCCCTGGGTCTCCGGGATGTCC
ACCTCGCCCTGTCTGAGGATCATGCTGGGTAGTGTTTGGGCCCAATGGGAGCAGACAGCTGAGGTCAC
CTGGCACGGCAAGGGCAACGAGGACCGCAGGGGCCAGACAGTCAATGCCGGTGTGGCTGAGCGGAGCTGG
CTGTACCTGAAAGGATCATACATGCGCTGTGACCGCAAGATGGAGGTGGCGTT CATGGTGTGTGCCATCA
ACCCTTCCATTGACCTGCACACCGACTCGCTGGAGCTTCTG CAGCTGCAGCAGAAGCTGCTCTGGCTGCT
CTATGACCTGGGACATCTGGAAGAAGTATCCCTATGGCCTTAGGGAACCTGGCAGATCTAGAGGAGCTGGAG
CCACCCCTGCGCGGCCGACGACCCACTACCCCTTACCACAAGGGCACTTGGCTCAGCCAGAGCTACTATC
GGGATGAACACATCTACCCCTACATGTACCTGGCTGGCTACC ACTGTGCAACCGCAATGTGCGGGAAGC
CCTGCAGGCCCTGGGCGGACACGGCCACTGT CATCCAGGACTACA ACTACTGCCGGGAAGACGAGGAGATC
TACAAGGAGTTCCTTTGAAGTAGGCCAATGATGT CATCCCCAACTGCTGAAGGAGTCCGAGCTTGTCTGG
AGGCGGGCGAGGAGCGCGCGGGGAGCAAGACGAGGCCACCGCAGGCCAAGGTTCCGCCCTCCAGGACC
TGAGTGTCTCGCCCACTGCTGCGATTCTACGACGGCATCTGCAATGGGAGGAGGCGATCCCAAGCCT
GTGCTGCACGTGGGCTGGGCCACCTTTCTTGTG CAGTCCCTAGGCCGTTTTGAGGGACAGGTGCGGCAGA
AGGTGCGCATAGTGTAGCCGAGAGGCCGAGGCCGAGGCCGAGGAGCGTGGGGCGAGGAAGCCCGGGA
AGGCCGCGCGCGCGGCCACCGCGGGAGTCCAAGCCAGAGGAGCCCCCGCGCCCAAGAAGACGAGCACTG
GACAAGGGCTCGGGCACCGGCCAGGGTGCAGTGT CAGGACCCCCCGGAAGCCTCTGGGACTGTGCTG
GCACAGCCCCGAGGCCCTGAAGGTGGCAGCAGCGCTCAGGTCCAGCAGCCCGCAGCATCACCAACCGCGGA
GGGTCCAGTGTCTACTTTCCAGAGTGAGAAGATGAAGGGCATGAAGGAGCTGCTGGTGGCCCAAGATC
AACTCGAGCGCCATCAAGCTGCAACTCAGCGACAGTGCAGTGCAGATGAAGAAGCAGAAAGTGTCCA
CCCCTAGTGACTACACTCTGTCTTTCTTCAAGCGGCAGCGCAAAGGCCCTGTA ACTACTGGGGACTTCCGG
ACCGCTTGTGGGGAACCGAGCTCCGCTTAGTCCCCCACTGAGGCCATGTCTTGCTGCCCCAGCCCAA
GGGGACAGGCCCTACCTCTACCCAAACCTAGGTTCCCGTCCCGAGTACAGTCTGTATCAAACCCACGA
TTTTCTCCAGCTCAGAACCCAGGGCTCTGCCCCAGTCTGTAGAATATAGGTCTCTTCTCCAGAAATCCCA
GCCCGCCCAATGGAAACCTCAGCTGGGTCTTAATTACAGTCTTTAAAGGCCAGCCCTAGAAACCCAA
GCTCCTCTCTCGAAACCGCTCACCTAGAGCCAGACCAACGTTACTCAGGGCTCTCCAGCTTGTAGGAGC
TGAGGTTCTCACTTAAACCAAGGAGCAGCTCCACCTCAGCGCCGGGAGCCTAGGACCACTCAGC
CCCTAGGAGTATATTTCCGCACTTCAGAATTCATATCTTGCBAATCCAAGCTCCCTGCCCCAAATAACT
TCAGTCTCTGCTTCAGAATTTGGAATCCTAGTTTCTCTCTCTCTCGTATCCCGAGTCTGGGACACAAAC
TCCGCCCCCAGCCTATGAGCATCTGAGCCCCGCCCTCTTCTGACGAAACTGGCCCCGGATCAGAGCAG
GACCTCCCTTCCGACCTCTGGGAACCTCCAGAGTCTCAGCGCATCTCGGAGCATCCCGGAGGAATCT
CGAGAGGGGTTAGGAGTGGGTGACAAGAGCTGATGTTCTCTCTCTGTTTGTACATAGATTTATTTTTCAGT
TCCAAGAAAGATGAATACATTTTGTAAAAA

Table 5 Histone Acetyltransferases.

GCN5/PCAF Family.

Gcn5

SEQ ID NO:121

>gi|4503954|ref|NM_001487.1| Homo sapiens GCN5 general control of amino-acid synthesis 5-like 1 (yeast) (GCN5L1), mRNA

CAGCGGGCAGCTGACATGGCCCCGGGGAGCCGAGGTGAGCGTCCAGCTTCCGGAGCCGGAGGGGGCCCCGG
CGTACCCAGCCCCAGCCCCGACGTGACCATGCTGTCCCGCTCCTAAAAGAACACCAGGCCAAGCAGAAT
GAACGCAAGGAGCTGCAGGAAAAGAGGAGGCGAGAGGCTATCACTGCAGCGACCTGCCTGACAGAAGCTT
TGGTGGATCACCTCAATGTGGGTGTGGCCAGGCCCTACATGAACCAGAGAAAGCTGGACCATGAGGTGAA
GACCTACAGGTCCAGGCTGCCCAATTGCGCAAGCAGACAGGCCAGTGGATCGGAATGGTGGAGAACTTC
AACCAGGCACTCAAGGAAATTGGGGATGTGGAGAATGGGGCTCGGAGCATCGAGCTGGACATGCGCACCA
TTGCCACTGCACTGGAATATGTCTACAAAGGGCAGCTGCAGTCTGCCCCCTCCTAGCCCCCTGTTCCCTCC
CCAAACCCTATCCCTCCTACCTACCCGAGGGGGAAGGAGGGAGGCTGACAAGCCTTGAATAAAACACA
AGCCTCC

GCN5L2

SEQ ID NO:122

>gi|10835100|ref|NM_021078.1| Homo sapiens GCN5 general control of amino-acid synthesis 5-like 2 (yeast) (GCN5L2), mRNA

CCGCTCTCCGCTGCGGGGGAGGCCATGGCGGAACCTTCCAGGCCCGGACCCCGGGCCCGGCTGCGCAGC
CCCGGGCCCTTCAGTCCCCAGCCCCGCCCCAACTCCGACTCCTGCACCCAGCCCGGCTTCAGCCCCGAT
TCCGACTCCCAACCCCGGCACCAAGCCCTGCCCCAGCTGCAGCCCCAGCCGCGCAGCAGGGACTGGGGGG
CCCGGGGTAGGAAGTGGGGGGGGCGGGAGCGGGGGGGATCCGGCTCGGCCCTGGCCTGAGCCAGCAGCAGC
GCGCCAGTCAGAGGAAGGCGCAAGTCCGGGGGGCTGCCCCGCGCAAGAAGCTTGAGAAGCTAGGGGTCTT
CTCGGCTTGCAAGGCCAATGGAACCTGTAAGTGTAAATGGCTGGAAAAACCCCAAGCCCCCACTGCACCC
CGCATAGATCTGCAGCAGCCAGCTGCCAACCTGAGTGAGCTGTGCCGAGTTGTGAGCACCCCTTGGCTG
ACCACGTATCCCATCTGGAGAATGTGTAGAGGATGAGATAAACCGACTGCTGGGGATGGTGGGTGATGT
GGAGAATCTCTCATGTCTGTTCAAGGAAGAGGACACAGACCAAGCAGGTCTATTTCTACCTCTTC
AAGCTACTGCGGAAATGCATCCTGCAGATGACCCGGCTGTGGTGGAGGGGTCCCTGGGCAGCCCTCCAT
TTGAGAAACCTAATATTGAGCAGGGTGTGCTGAACCTTTGTGCAGTACAAGTTTAGTCACTGGCTCCCCG
GGAGCGGCAGACGATGTTTCGAGCTCTCAAAGATGTTCTTGTCTGCTTAACCTACTGGGAGCTTGAGACA
CTGCCCCAGTTTTCGGCAGAGGTCTCAGGCTGAGGACGTGGCTACCTACAAGGTCAATTACACCAGATGGC
TCTGTTACTGCCAGTGCCCCAGAGCTGTGATAGCCTCCCCGCTACGAAACCACTCATGTCTTTGGGCG
AAGCCTTCTCCGTTCCATTTTACCGTTACCCGCCGCGCAGCTGCTGGAAAAGTTCCGAGTGGAGAAGGAC
AAATTGGTCCCCGAGAAGAGGACCTCATCCTCACTCACTTCCCCAAATTCTGTCCATGCTGGAGGAGG
AGATCTATGGGGCAAACCTCTCCAATCTGGGAGTCAGGCTTACCATGCCACCCTCAGAGGGGACACAGCT
GGTTCGCCCGCCAGCTTCAGTCAGTGCAGCGGTTGTTCCAGCACCCCATCTTCAGCCCCAGCTGGGT
GGGGGCAGCAACAGCTCCCTGAGTCTGGATTCTGCAGGGCCGAGCCTATGCCAGGCGAGAAGAGGACGC
TCCCAGAGAACCTGACCCTGGAGGATGCCAAGCGGCTCCGTGTGATGGGTGACATCCCATGGAGCTGGT
CAATGAGGTCTATGCTGACCATCACTGACCCTGCTGCCATGCTGGGGCCTGAGACGAGCCTGCTTTCCGGCC
AATGCGGCCCGGGATGAGACAGCCCGCTGGAGGAGCGCCGCGGCATCATCGAGTTCATGTCTATCGGCA
ACTCACTGACGCCCAAGGCCAACCGCGGGGTGTTGCTGTGGCTCGTGGGGCTGCAGAATGCTTTTTCCCA
CCAGCTGCCCGCATGCCTAAGGAGTATATCGCCCGCTCGTCTTTGACCCGAAGCACAAGACTCTGGCC
TTGATCAAGGATGGGCGGGTCACTCGGTGGCATCTGCTTCCGATGTTTCCACCCAGGGCTTCACGGAGA
TTGTCTTCTGTGCTGTACCTCGAATGAGCAGGTCAAGGTTATGGGACCCACCTGATGAACCACCTGAA
GGAGTATCATCAAGCACAACATTTCTACTTCTCACCTACGCCGACGAGTACGCCATCGGCTACTTC
AAAAAGCAGGGTTTCTCCAAGGACATCAAGGTGCCAAGAGCCGCTACCTGGGCTACATCAAGGACTACG
AGGGAGCGACGCTGATGGAGTGTGAGCTGAATCCCCGCATCCCTACACGGAGCTGTCCACATCATCAA
GAAGCAGAAAGAGATCATCAAGAAGCTGATTGAGCGCAACAGGCCAGATCCGCAAGGTCTACCCGGGG
CTCAGCTGCTTCAAGGAGGGCGTGAGGCAGATCCCTGTGGAGAGCGTTTCTGGCATTCGAGAGACAGGCT
GGAAGCCATTTGGGAAGGAGAAGGGGAAGGAGCTGAAGACCCCGACCAGCTTACACAACCCCTCAAAA
CCTGCTGGGCCCAATCAAGTCTCACCCAGTGCCTGGCCCTTCATGGAGCCTGTGAAGAAGTCGGAGGCC
CCTGACTACTACGAGGTCTACCGCTTCCCCATTGACCTGAAGACCATGACTGAGCGGCTGCGAAGCCGCT
ACTACGTGACCCGGAAGCTCTTTGTGGCCGACCTGCAGCGGCTCATGCCAAGTGTGCGGAGTACAACCC
CCCGGACAGCGAGTACTGCCGCTGTGCCAGCGCCCTGGAGAAGTTCTTCTACTTCAAGCTCAAGGAGGGA
GGCCTCATTGACAAGTAGGCCCATCTTTGGGCGCGACCCCTGACCTGGAATGTCTCCACCTCGGATCTTG
ATCTGATCCTTAGGGGGTGCCCTGGCCCCACGGACCCGACTCAGCTTGAGACACTCCAGCCAAGGGTCTCT
CCGGACCCGATCCTGCAGCTCTTCTGGACCTTACGGCACCCCCAAGCGTGACGCTCTGTCCAGCCTTC

ACTGTGTGTGAGAGGTCTCCTGGGTTGGGGCCAGCCCTCTAGAGTAGCTGGTGGCCAGGGATGAACCT
 TGCCAGCCGTGGTGGCCCCAGGCCCTGGTCCCCAAGAGCTTTGGAGGCTTGGATTCTGGGCTGGCCC
 AGGTGGCTGTTTCCCTGAGGACCAGAACTGCTCATTCTTAGCTTGAGTGATGGCTTCAGGGGTGGAAGTT
 CAGCCCAACTGAAGGGGGCCATGCCTTGTCCAGCACTGTTCTGTCACTCTCCCCAGGGGTGGGGGGTA
 TGGGGACCATTTCCTTCCCTGGCATTATCCCTTAGAGGGAATAATAAGCTTTTTATTCTCTG

PCAF

SEQ ID NO:123

>gi|6382075|ref|NM_003884.2| Homo sapiens p300/CBP-associated factor
 (PCAF), mRNA

GGGGCCCGCTCGACGCGGAAAAGAGGCCGTGGGGGGCCTCCAGCGCTGGCAGACACCGTGAGGCTGGCA
 GCCGCCGCGCAGCACACCTAGTCCGAGTCCCGAGGAACATGTCCGAGCCAGGGCGCGGAGCAGAGTCC
 CGGGCAGGAGAAACCAAGGGAGGGCGTGTCTGTGGCGGCGGCGAGCGGCAGCGGAGCCGCTAGTCCCC
 TCCCTCCTGGGGGAGCAGCTGCCGCCGCTGCCGCCGCCGCCACCACCATCAGCGCGCGGGGCCCGCCAG
 AGCGAGCCGGGCGAGCGGCGCGCTAGGGGGAGGGCGGGGGAGGGGGGTGGGCGAAGGGGGCGGGA
 GGGCGTGGGGGGAGGGTCTCGCTCTCCGACTACCAGAGCCCGAGGGAGACCTTGGCGGCGGCGGGCG
 CCTGACACTCGGCGCCTCTGCCGTGCTCCGGGGCGGCATGTCCGAGGCTGGCGGGCGGGCCGGGCGG
 CTGCGGGGAGGAGCGGGGCGGGGCGGGGCCGGGCGCTGCCCGCAGCTTGGCGCGCTTCCGCC
 GCGCCCCGCGAGGGCTCCCCCTGCGCGCTGCGCGCGGGGGCTCGGGCGCCTGCGGTCCGGCGACGGCAG
 TGGCTGCGAGCGGGCAGGCGCGAAGGACCGGGAGGCGGTGGCTCGGCCCGAATCGCCGTGAAGAAAGCGCA
 ACTACGCTCCGCTCCGCGGGCCAAGAACTGGAGAACTCGGAGTGTACTCCGCTGCAAGGCCGAGGAG
 TCTTGTAATGTAAATGGCTGGAACAAACCTAACCCCTCAGCCACTCCCCCAGAGCCGACCTGCAGCAA
 TAATGTGTCAGTCTAACAGAACTCTGTCGGAGTTGTAGCCATGCCCTAGCTGTCTATGTTTCCACCTGGA
 GAATGTGTGAGAGGAAGAAATGAACAGACTCCTGGGAATAGTATTGGATGTGAATATCTCTTACCTGT
 GTCCACAAGGAAGAAGATGCAGATACCAACAAGTTTATTTCTATCTATTTAAGCTCTTGAGAAAGTCTA
 TTTTACAAAGAGGAAAACCTGTGGTTGAAGGCTCTTTGGAAAAGAAACCCCAATTTGAAAACCTAGCAT
 TGAACAGGGTGTGAATAACTTTGTGTCAGTACAAATTTAGTCACCTGCCAGCAAAAGAAAGGCAACATA
 GTTGAGTTGGCAAAAATGTTCTTAAACCGCATCACTATTGGCATCTGGAGGCACCATCTCAACGAAGAC
 TGGATCTCCCAATGATGATATTTCTGGATACAAAGAGAACTACACAAGGTGGCTGTGTTACTGCAACGT
 GCCACAGTTCTGCGACAGTCTACCTCGGTACGAAACACACAGGTGTTTGGGAGAACATTGCTTCCGCTCG
 GTCTTCACTGTTATGAGGCGACAACCTCTGGAACAGCAAGACAGGAAAAGATAAACTGCCTCTTGA
 AACGAACCTCTAATCTCACTCATTTCCTTAAATTTCTGTCCATGCTAGAGAAGAAGTATATAGTCAAAA
 CTCTCCCATCTGGGATCAGGATTTCTCTCAGCCCTTCCAGAACCAGCCAGCTAGGCATCCAACAGTT
 ATCAATCCACCTCTGTGGCTGGGACAATTTCATACAATTTCAACCTCATCTTCCCTTGAGCAGCCAAACG
 CAGGGAGCAGCAGTCTGCTGCAAGCCTCTTCTGGACTTGAGGCAAAACCCAGGAGAAAAGAGGAAAT
 GACTGATTCTCATGTTCTGGAGGAGGCCAAGAAACCCCGAGTTATGGGGGATATTCCGATGGAATTAATC
 AACGAGGTTATGTCTACCATCAGGACCTGCGCAATGCTTGGACCAGAGACCAATTTCTGTGAGCAC
 ACTCGGCCAGGGATGAGGCGGCAAGGTTGGAAGAGCGCAGGGGTGTAATTGAATTTACGTGGTTGGCAA
 TTCCCTCAACCAGAAACCAACAAGAAGATCCTGATGTGGCTGGTTGGCCTACAGAACGTTTTCTCCAC
 CAGCTGCCCCGAATGCCAAAAGAATACATCACAGGCTCGTCTTTGACCGAAACACAAAACCTTGCTT
 TAATTAAGATGGCCGTGTTATTGGTGGTATCTGTTCCGTATGTTCCCATCTCAAGGATTCACAGAGAT
 TGTCTTCTGTGCTGTAACCTCAAATGAGCAAGTCAAGGGCTATGGAACACACCTGATGAATCATTTGAA
 GAATATCACATAAAGCATGACATCTGAACCTCTCACATATGCAGATGAATATGCAATGGATACCTTA
 AGAAACAGGGTTTCTCCAAAGAAATTAATAACCTAAAACCAATATGTTGGCTATATCAAGGATTATGA
 AGGAGCCACTTAAATGGGATGTGAGCTAAATCCAGGATCCCGTACACAGAATTTTCTGTCTATCTAAA
 AAGCAGAAGGAGATAATTAATAAAGTATTGAAAGAAAACAGGCACAAATTCGAAAAGTTTACCCTGGAC
 TTTTATGTTTTAAAGATGGAGTTTCGACAGATTCTATAGAAAGCAATTCCTGGAATTAGAGAGACAGGCTG
 GAAACCGAGTGGAAAAGAGAAAAGTAAAGAGCCAGAGACCTGACAGCTTTACAGCACGCTCAAGAGC
 ATCTCCAGCAGGTGAAGAGCCATCAAAGCGCTTGGCCCTTCATGGAACCTGTGAAGAGAACAGAAGCTC
 CAGGATATTAAGAGTTATAAGGTTCCCATGGATCTGAAAACCATGAGTGAACGCCTCAAGAATAGGTA
 CTACGTGTCTAAGAAATTAATCATGGCAGACTTACAGCGAGTCTTTACCAATTGCAAGAGTACACGCC
 GCTGAGAGTGAATACTACAAATGTGCCAATATCCTGGAGAAATCTTCTTCAAGTAAATTAAGGAAGCTG
 GATTAAATGACAAGTGATTTTTTTTCCCTCTGCTTCTTAGAAACTCACCAAGCAGTGTGCTTAAAGCA
 AGGT

MOZ

SEQ ID NO:124

>gi|5803097|ref|NM_006766.1| Homo sapiens zinc finger protein 220

(ZNF220), mRNA
GGCACGAGGTTTGGGGGCATCTCCGCGGTCCGGCCCGGGGCCCCGGGATCTCGGCTGTCTTCTCCCGGC
ATAAGATGCACATTTTCTGCTCTGGAGCCGGGAATGAAATATTCTTGAGTTCTTACAACCTTATGACGA
GACCCATGTGTGGTGCTATTGAGAAATTCATTGGGAAGTTGGAAGACATTTCAAACACAGGTTGTTTTG
GTTTCTATAGTACAATTGGGGTGGCATTCTGTTTTGTGAAAGGAGGAAGGACTTAGGCCAGAAAACATCAT
ATGCTATGGTTAACTGGTCCAGCCTCCGAGAATCTTGTTTCCATGGTGTAAAACTTACTCAGCATCA
GGATAAGGGATAACGACTCTATGGATATACAGAATCCTTCACCATGGTAAAACTCGCAAACCCGCTTTAT
ACTGAGTGGATTCTTGGAGGCCATCAAAAAAGTGAAAAAGCAGAAACAGCGTCTTTCAGAAGAAAGGATAT
GCAATGCTGTGCTTTCATCCCATGGCTTGGATCGTAAAACTGTTTTAGAACAAATTGGAGTTGAGTGTAA
AGATGGAACAAATTTTAAAGTCTCAAATAAAGGACTCAATTCTATAAAGATCCTGATAATCCTGGGCGA
ATAGCACTTCTAAGCCTCGGAACCATGAAAATTGGATAATAACAAAATGTGGATTGGAATAAACTGA
TAAAGCGGGCAGTTGAGGGCTTGGCAGAGTCTGGTGGCTCAACTTTGAAAAGCATTGAACGTTTTTTGAA
AGGTGAGAAGGATGTGTCTGCATTATTCGGAGGACGTGCTGCCCTCTGGCTTTCACCAGCAGTTACGATTG
GCTATCAAAACGTGCCATTGGCCACGGCAGACTCCTTAAAGATGGACCTCTTTATCGGCTCAACACTAAAG
CAACCAACGTGGATGGGAAAGAGAGTTGTGAGTCTCTTCTGTTTACCTCCAGTGTCCCTTCTTCCACA
TGAAAAGGATAAGCCGGTTGCTGAACCAATCCCCATCTGTAGTTTCTGTCTTGGTACAAAAGAACAAAAC
CGAGAAAAGAGCCAGAGGAACCTCATCTCTGTGCCGACTGTGGCAACAGTGGCCATCCATCCTGTTTTAA
AGTTTTCCCTGAACTAACGGTTCGAGTGAAGGCCTTACGGTGGCAGTGCATCGAGTGTAAAAACATGCAG
CTCTGTGCGAGATCAAGGCAAAATGCGGATAAACATGCTCTTTGTGATTTCATGTGACCGAGGTTTTTAC
ATGGAGTGTGTGATCCGCCACTCACCCGTATGCCAAAAGGCATGTGGATATGTCAAATATGTGACCTA
GGAAAAAGGACGAAAACCTTCTACAAAAGAGGCAGCACAGATAAAACGGCGCTATACTAATCCAATAGG
ACGTCCAAAAAACAGGTTAAAGAAACAAAACACGGTATCAAAGGTCCTTCAGCAAAGTTTGAAGTGGC
CCTGGAAGGGGTAGGAAACGAAAATCACTCTTTCAGCCAATCAGCATCATCATCAGAAAGAGGAT
ATTTAGAGCGGATAGATGGCTTGGACTTCTGCAGAGATAGCAATGTGTCTTGGAGTTCAACAAGAAAC
CAAGGGCTCATGATGGCCTTACCAATTTTTTACCCCTTCCCTGATGGGCGGAAAGCTCGGGGGGAA
GTGGTGGACTACTCTGAGCAATATCGAATCAGAAAGAGGGGCAACAGGAAATCAAGCACTTCAGATTGGC
CCACAGACATCAGGATGGCTGGGATGGCAAAACAGAAAATGAGGAGCGACTTTTTGGGAGCCAGGAAT
CATGACTGAGAAAGATATGGAATTATTCGTGATATCCAAGAACAGCACTGCAGAAAGTTGGAGTGACT
GGTCCCCCTGATCCACAAGTCCGCTGTCCCTCTGTCTTGTAGTTTGGGAAGTATGAAATTCACACTGGT
ACTCCTCCCATATCCTCAAGAATACTCAAGGCTGCCCAAATTTGTATCTTTGTGAATTTTGTCTAAAATA
TATGAAAAGTAGAACTATTCTGCAGCAGCATGAAGAAATGTGGTTGGTTCCATCCTCCTGCCAATGAG
ATTTACAGAAAGAATAATATTTCTGTCTTTGAGGTTGATGGGAATGTGAGTACCATTATTTGTCAAACC
TGTGTCTTTTGGCAAAGTTGTTTCTTGACCACAAAACCTCTATTACGATGTGGAGCCATTCTTTTTTA
TGTACTAACGAAATGATGTCAAGGGCTGCCACTTGTGGCTACTTTTCTAAGGAAAGCAATGCTTCCAA
CAGAAGTACAATGTTTCTGTATAATGATTCTTCTCAATACCAGCGTAAGGGCTATGGCAGGTTTCTCA
TCGATTTCACTTATTTGTTATCAAAGCGTGAAGGCCAAGCAGGGTCTCCAGAGAAACCGTTATCTGATCT
GGGTCTGTCTTCTTACATGGCATATTGGAAGAGTGAATATTGGAGTGCCTTTATCCCAAATGACAAG
CAGATCAGCATTTGAAGTTAAGCAAGTTGACTGGAATCTGCCCTCAAGACATCACTTCCACACTCCACC
ACCTACGAATGTAAGACTTCCGTAGTGACCAATTTGTGATTATCCGCGGGGAAAACTTATCCAGGATCA
CATGGCAAAGCTTCAGCTGAATTTGCGACCTGTAGATGTAGATCCAGAATGTTTGGCTGGACTCCAGTC
ATAGTGTCCAACCTCTGTGGTCTCAGAGGAGGAAGAAGAGGAGGCTGAGGAAGGAGAAAACGAAGAGCCAC
AGTGCCAGGAAAGAGAATTAGAGATCAGTGTGGGAAAGTCTGTGTCTCATGAGAACAAAGAACAGATTCT
TTATTCAGTAGAAAGTGAAGAAGAAACCAGAAGTTATGGCTCCAGTCAGTTCTACACGTTTGAGCAACAA
GTCTTCTCATGATAGTCTTCTGCAATAGCCAGCCATCTCGGAGGGGCGCTGGGGGAGGAAGAACA
GAAAAACCCAGGAACGTTTTTGGTGATAAAGATTCTAACTGCTCTTGGGAAGAGACGCTTTCAGCTCCTCA
GGAACAATATGGAGAATGTGGGGAGAAATCAGAAGCCACCCAGGAACAATACACTGAAAGTGAAGAACAG
CTGGTGGCTTCTGAGGAGCAGCCAAGCCAGGACGGGAAACCTGACCTTCCCAAGAGAAGACTCAGTGAGG
GGGTTGAGCCCTGGCGAGGACAGCTCAAGAAAAGCCCTGAGGCTCTGAAGTGCAGATTACAGAAGGAAG
TGAGAGGCTGCCCCGTGCTACAGTGAGGGTGACAGGGCTGTCTCAGGGGCTTCACTGAGAGCAGCGAG
GAGGAGGAGGAGCCGGAAGCCCTCGGTCAAGCTCGCCACCAATTTCTACAAAGCCCACGCTGAAGCGAA
AGAAACCAATTTCTCCACCGAAGGAGGAGAGTCCGAAAGCGCAAACACCACAATAGCAGTGTAGTCAAGA
AACTATTTCTGAGACCACTGAAGTGTAGATGAACCTTTTGAAGATTCTGACTCCGAGAGGCCAATGCCA
AGATTAGAACCACATTTGAGATCGATGAAGAAGAGGAGGAAGAGGATGAAAATGAATTTTCCCTAGAG
AATACTTCCGTGTTTTGTCTTCGACGATGTACTCAGGTGTGCTCTTCTTAAGAGGAAGTCTAAAGA
TGAAGAAGAAGATGAAGAGTCAAGATGATGCTGATGACACTCCTATCTTAAAGCCAGTATCTCTTTTGCGA
AAACGTGATGTGAAGAATTCTCTCTTGAGCCAGATACATCCACACCTTTGAAAAAGAAAAGGGATGGC
CCAAAGGCAAGAGCCGCAAAACCAATCCACTGGAAGAAAAGACCTGGTGGAAAACAGGATTTAAGTTGAG
TCGGGAAATCATGCCAGTTTCTACTCAAGCATCGTTCATTGAGCCCATCGTTTCCATTCTTAAGAGTGA
CGTAAACCAAGATCCAGGAGAGTGAAGAACTGTTGAGCCAAAAGAGACATGCCCTTACCCAGGAGA
GGAAGGAGGAGGAGGAGATGCAAGCAGAGGCAGAAGAGGCTGAAGAGGGTGAGGAAGAGGATGCAGCCAG
CAGTGAAGTCCAGCAGCCTCTCCAGCAGACAGCAGCAATAGTCTGAGACCGAAACCAAGGAGCCTGAG
GTGGAGGAGGAAGAAGAGAAGCCCGTGTCTCAGAGGAGCAGAGGCAGTCAGAGGAGGAGCAGCAGGAAT
TAGAGGAGCCAGAGCCAGAGGAGGAGGAAGATGCAGCTGCAGAGACTGCCAGAATGACGACCAACGACGC
TGATGATGAGGATGATGGCCACCTGGAGTCCCAAAGAAAAGGAGCTAGAGGAACAGCCACAGGGGAA
GATGTCAAGGAGGAGCCTGGTGTTCAGAGTCTTTTTTAGATGCTAATATGCAGAAGAGTAGGGAAAAGA
TAAAGGATAAAGAGGAACCGAGCTGGATTCCGAAGAGGAGCAGCCTTCCCATGACACGTCCTGTGTGTC

AGAGCAGATGGCTGGGTCTGAGGACGACCACGAAGAAGACTCCCACTAAGGAAGAGTTAATCGAATTA
AAAGAGGAGGAAGAGATTCTCATAGTGAGCTGGATCTGGAACTGTACAGGCAGTGCAGTCTTTGACTC
AAGAAGAAAGCAGTGAGCATGAGGGCGCTTACCAGGACTGTGAGGAACTCTTGCGGCGTGTGAGACCCT
GCAGAGTTACACCCAGGCTGACGAGGACCCCTCAGATGTCCATGGTTGAAGACTGTCTATGCGTCAGAACAT
AATAGCCCTATCTCCTCCGTTTCACTCTCAGCCAGCCAGCAAGGATCCCTGTCCGCAACCCTCTATGCAGAA
CTGCCCTTGAGAGTGGCTACACCCAGATCAGCCAGCCAGTCCGTTCCGTCAGCAGTCCCAACGTGC
CATGGAGACCAGCCCATGATGGATGTGCCCTTCCGTATCAGACCACTCTCAGCAGGTGGTGGACAGCGGC
TTCAGTGACCTGGGCAGCATTTGAGAGCACCCTGAAAACCTATGAGAACCAGCAGTTACGACTCCACGA
TGGGCGGCAGCATCTGTGGGAACAGCTCTTCCAGAGCAGCTGCTCCTACGGTGGGCTGTCTCTCCAG
CAGCCTCACCAGAGCAGCTGTGTGGTCACTCAGCAGATGGCCAGCATGGGCAGCAGCTGCAGCATGATG
CAGCAGAGCAGCGTCCAGCCTGTGTCGCAACTGCAGCATCAAGTCACTCAGAGCTGCGTGGTGGAGAGGC
CTCCAGTAACAGCAGCAGCAGCGCCACCACCGCCTCCACAGCAGCCACAGCGCCGCCGACAAACC
ACAACCAGCACCACAGCCTCCACCACCCAGCAGCAGCCGCAACAGCAGCCGAGCCTCAGCCCCAGCAG
CCTCCACCCCCACCCCTCCCCAGCAGCAGCCCCGCTGTACAGTGTAGTATGAATAACAGTTTCACCC
CAGCTCCTATGATCATGGAGATACCAAGTCTGGAAGCACTGGGAACATAAGTATCTATGAGAGGATTCC
AGGGGATTTTGGTGGCGGCAGCTACTCTCAACCCTCAGCCACCTCAGCCTAGCCAAGCTGCAGCAGCTG
ACCAACACCATTATGGACCCTCATGCCATGCCCTTATAGCCATTCTCCTGTGTGACTTCTCTATGCAACCA
GTGTTTCTCTGTCCAATACAGGACTGGCTCAGCTGGCTCCATCTCATCCCTTAGCTGGGACTCCTCAAGC
ACAAGCCACCATGACGCCACCCCAACTTGGCATCCACTACCATGAACCTCACATCTCTCTGCTTCAG
TGCAACATGTCTGCCACCAACATTGGCATCTCTCACACGAGAGATTGCAAGGGCAATGCCAGTGAAGG
GGCAGATTTCATCCGCTCCAGTCTGCGCCACTGCCCTCTGCGGCTGCTCACCAGCAGCAGCTGTATGG
CCGTAGCCCATCGGCAGTTGCCATGCAGGCTGGCCCTCGCGCACTGGCTGTTTCCGCTGGCATGAACATG
GGGGTTAATCTGATGCCTACTCCCGCTTATAATGTCAATTCATGAATATGAACACCTTGAATGCCATGA
ACAGCTATCGAATGACACAGCCCATGATGAACAGCAGTTACCATAGTAACCTGCCCTACATGAACCAGAC
AGCAGATGCTCTGAGATGCAGATGGGAATGATGGGAGCCAGGCCTATACCCAGCAGCCTATGCGC
CCTAACCTCATGGGAACATGATGTACACAGGCCCTCCCATCAGAGTACATGAACGCTGCTGGCGTGC
CCAAGCAGTCACTCAACGGACCTTACATGAGAAGATGAGCAAGATGAACCTGCAATCAAAAACCTTAAATA
TATATAAATAAAGGAACCTTTTATACTGACAAACCAGAGAAAATGGACCTTTTCCAGTTAAATATTTG
CTGTAGATTTAGAGGAATTTTCTTTGGTTTATTTTATTTTATAGAAAACCTGATCTTCTCTTTTTTTG
GGTTCAATTTTGTGTGGGTTTGGTTTCTTCAACATCTGAACATTTTACAGTAGAACTCATCTAAAA
TGGATTTGGGGATGGGGAACATGCACAAAATCTTTTATAATTAAGAGCCTTACTTTCTTTTACATA
CCACATGGACAGAATTTGTGTAAAAGTGAATTATCTTTATTTTAAATGTATGTTTCCCTCACTGTTT
CAGCTCCCAATGTTGTCAATTTTAAATGTTATATACATCTCAAGGGTTAACCAGACCCCTTCTCCTCAAC
CCAACCTTTCAATTTCTTACTTCAATTCAGCAGGAGGCACTTAGGGGAGACTCGGATGGGGACATGGAGAA
CAACCAAGCTCCTTAACTTATTATTGTTAATATTATTATTATTATTATTAATAAAGTGAGGACAGG
AAAATGCTTCTCCTTTTAAATCCCTCCACTCCTCACACACACACCTCTTGAACCCCTTCCCAAGA
ATGTTCTTTTATAGACGGACTTCATTGAAATCTTTGTTGTTCTTGAATCAAGTGTAATATAATTTTTTC
TTCTTTTAAATATTCCCACTCAGCACTCAGAGACACAAAATACTGTAAGTCTCAATTAACAGCAGA
ATCTCAGAGAAAAGCTGTTTGAATCCAAATCCAGCCTTGGAGGAATAGAGATGGTCAATTAACAATCA
AAAAGAGGAGATTAACTCTGTTTTTACCACCTGGTGAATCAGCCATAACGCACACACAGCCACCC
AGCCTCTTGTCTTAGTATGTACTTTGAAATGCTAAGCTGAGGGTCTTGATGCTTGAGCCTTTGACTGATA
AAACTCAATAGCAGTCCCAAGTGATTTGCCTCTTAGGTTCTTTCTTAAATTTGTTGGTGGATGACTGTAC
ATTTTAGTGATTTGAAAATAAAGTACAAACCAATTGAAACAGTTTATTTTATGTTGGAAGAGATGGCGCA
GATGTGTGTGAGAGGGAGATCAGCGTGTGAGTTTCGTAGCTATTTAAGTGATACATACCTCTAGTTTTT
GTATGCTTTTGAAGATCTGAGTTTCCCTGAGTCACTGAGGAGCCTGCTTACTCTACCAGAAGAGTGACCCGTA
TAATGAGAAGAGGGACAGACCGACCACAGCAGTACAGGAGATCGGACAGCAGAAATGTTATAACGCA
AGTTTATGTGTTGCTCCCACTCCATTCTCTTTCTCTGTCGTAACCAAGTTTGGCCATTCTCTCTCTATT
ACTTGCTCCAGGGATAGGTAAAAA

HBO1

SEQ ID NO:125

>gi|5901961|ref|NM_007067.1| Homo sapiens histone acetyltransferase
(HBOA), mRNA

GCCGCTGCCGAATCGGAACCGTCGGGCCGAGCCGCCGCAATGCCGGAAGGAAGAGGAATGCAGGCA
GTAGTTGAGATGGAACCGAAGATTCCGATTTTCTACAGATCTCGAGCACACAGACAGTTTCAAGAGTGA
TGGCAGATCCCGACGATCTGCTCGAGTCAACCGCTCCTCAGCCAGGCTAAGCCAGAGTTTCTCAAGATTCC
AGTCTGTTGGAATCTGAGTCTTTTGGCACTGAGGAGCCTGCTTACTCTACCAGAAGAGTGACCCGTA
GTCAGCAGCAGCCTACCCAGTGACACCGAAAAAATACCCCTTTCGGCAGACTCGTTTCACTGTTTCAGA
AACTGAGCAAGTGGTTGATTTTTTCAATAGAGAACTAAAAATACAGTGTATGATGAGTCAACCGCT
CGAATCCAACTGGAATGCGCCTTCTTCTGAGTCTGACATAGATATCTCCAGCCCCAATGTATCTCAG
ATGAGAGCATTGCCAAGGACATGTCCTGAGGACTCAGGAGTGATCTCTCTCATCGCCCCAAGCGCCG
TCGCTTCCATGAAAGCTACAACCTCAATATGAAGTGTCTACACAGGCTGTAACCTCTTAGGACACCTT

ACAGGAAAAACATGAGAGACATTTCTCCATCTCAGGATGCCCACTGTATCATAACCTCTCAGCTGACGAAT GCAAGGTGAGAGCACAGAGCCGGGATAAGCAGATAGAAGAAAGGATGCTGTCTCACAGGCAAGATGACAA CAACAGGCATGCAACCAGGCACCAGGCACCAACGGAGAGGCAGCTTCGATATAAGGAAAAAGTGGCTGAA CTCAGGAAGAAAAAGAAATTTCTGGACTGAGCAAAGAACAGAAAGAGAAATATATGGAACACAGACAGACCT ATGGGAACACACCGGGAACCTCTTTTAGAAAACCTGACAAGCGAGTATGACTTGGATCTTTTCCGAAGAGC ACAAGCCCGGGCTTCAGAGGATTTGGAGAAGTTAAGGCTGCAAGGCCAAATCACAGAGGGAAGCAACATG ATTAAAACAATTGCTTTTGGCCGCTATGAGCTTGATACCTGGTATCATTTCTCCATATCCTGAAGAATATG CACGGCTGGGACGTCTCTATATGTGTGAATTCTGTTTAAAAATATATGAAGAGCCAAACGATACTCCGCCG GCACATGGCCAAATGTGTGTGGAACACCCACCTGGTGATGAGATATATCGCAAAGGTTCAATCTCTGTG TTTGAAGTGGATGGCAAGAAAAACAAGATCTACTGCCAAAACCTGTGCCTGTTGGCCAAACTTTTCTGG ACCACAAGACATTATATTATGATGTGTGGACATTGTGAGCACTCTGCAAGCCCTTCAGATGCTCAAATACTGGAAGG CTGTCACTGATTGGATATTTTTCTAAGGAAAAGAAATTCATTCTCAACTACAACGTCTCCTGTATCCTT ACTATGCCTCAGTACATGAGACAGGGCTATGGCAAGATGCTTATTGATTTTCAGTTATTTGCTTTCCAAAG TCGAAGAAAAAGTTGGCTCCCCAGAACGTCCACTCTCAGATCTGGGGCTTATAAGCTATCGCAGTTACTG GAAAGAAGTACTTCTCCGCTACCTGCATAATTTTCAAGGCAAAGAGATTTCTATCAAAGAAATCAGTCAG GAGACGGCTGTGAATCCTGTGTGGACATTGTGAGCACTCTGCAAGCCCTTCAGATGCTCAAATACTGGAAGG GAAAAACCTAGTTTTTAAAGAGACAGGACCTGATTGATGAGTGGATAGCCAAAGAGGCCAAAAGGTCCAA CTCCAATAAAACCATGGATCCCAGCTGCTTAAATGGACCCCTCCCAAGGGCACTTAAAGTGACCTGTCA TTCCGAGCCAGCGAAACCCAGCAGTAGGAATCCGTACCCTAGGGATCTGTCTGTCAATTTCTCTGTTGCTC TTGTGATTGGCAAGTACAGTATCCTTTGGGAAGGCCATCCCCCTCAGGACTGTCTGGCTCCGACCTTTTG TGACACTGCAGACGCTGGTTCTGAGGAACCTGTTGTTTCGGCCTCAGTGAGGTTGCCTGGATGGGATCTG TATTAGACTTGAGTGCAGGTCTCTCAGCACTGACCCAAAGAGTTCTGTTATGGTACTGTACCTGTCCAGT CACTGGTTCTCTCCTCATGTCTCTCGCCCCATGAGGTTGTGTTGTGTCTTCTAAGCGTGGTACTAGTGC TTGCCACCTGGTCACCAGACCTCCAAATATGGCTGCCACCACCAGGACCTTTCAGTTACTCCTTATATG TGTGTTCTATGGAGGGGCAGGAAAAGGTGGCACTTGTGAGTGTGTGTGGATTGGCAGGGGGTCCATTCA CTTTGGGTTCCATCTTGCTTTAAATTTCTTCATTTTGATTAAGAGACCTCTTTTGATCTGTATTGGGCT AACCAGAGCCAAATACTTTTGAAGAGTTTCCAGGGACTAGTCATGGTAATAGCATATAATTGATCTGAA TGAGATGGAGAGAAGAATGAAGGGGTGGTGGTTCTGGGTTTGATTGAGTTCACCTGTGGGCAGTGGGCA GTGGGCAGTGTCTTGGTGAAGGGAACGGATACTACTTTTGCCTCACCGTAAAGTACTCACTAGTAAAT ATTTCTTCTCTCTTTACTCCCACTTTTTACGTTTTGCAGGTGCCAAAGTAATGTCCACTTTTCCCTTTTCA TGCTGCATATTAACTGGTTAATTATACTGCAGAAACCTTTTACCTCCACTAGTCTGATACAGTACATCT GTACTTCCATATACCTTGCACCTGATTTGTCTGAGTGCCCTGGGAGAAGTAGAAAATGATTGAAAGTGAC TTCCGTATCTCAGCCCATGACTCAGCAAGGCAGAATGGCCACCCCTGCCAAAGTTTGCTTCTCTTTTCAA CAGTGCCTCACCTCCCTCTAGGATTAAGTGCTTCTGCCCTTCCACGAACCTCCTCCTCAATTTCTTTT TGGGATTTGTACCATCCTTCTATTCTCTGGTCTTCTATTTTGGTGTGTTCAAGTGAAGGAAGAGATG TTCCCTCTAATTTCTCTCTAGCCCATATAACCTGCTATCTTGGGGCAACTTTTGATGTATGACATGTCA CCCTTCCCAACTTGGTCTCCTCCAACATGCTGTCTTTCATGTGGAGCCCTCACCAATCCCTGACTCCGG TCATTTGTGCCTTTCTCTTGTCTCTCTGTACACTACTTATATTCACTGTGGGTTGGGGGAGCTAATTTT AAGCATGTTTCAGTGGCAGCTCCCCCAGTTTCAGTGTCACTGTTAAATTTATCAAAAAGCAACTTCAC TAGGGTTTTTCTTTAAGGGATAAAGGCCTTTTACAGAAGCTAAACCCCTTCCCCACATGTGGTAGAATGTGC TCTTCTATATCTACTCCTCAATAAAGCATGTTCTCTGCTCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA AAAA
SRC Family
SRC-1
SEQ ID NO:126
>gi 4507198 ref NM_003743.1 Homo sapiens nuclear receptor coactivator 1 (NCOA1), mRNA ATATCATCGACAGGGAGCACAGTGGGCTTCTCCTCAAGATGACACTAATTCTGGAATGTCAATTCCCCG AGTAAATCCCTCGGTCAATCCTAGTATCTCTCCAGCTCATGGTGTGGCTCGTTCATCCACATTGCCACCA TCCAACAGCAACATGGTATCCACCAGATAAAACCGCCAGCAGAGCTCAGACCTTCATAGCAGCAGTCATA GTAATCTAGCAACAGCCAAGGAAGTTTCGGATGCTCACCCGGAAGTCAGATTGTAGCCAATGTTGCCTT AAACAAAGGACAGGCCAGTTTCAGAGCAGTAAACCTCTTTAAACCTCAATAATCCTCCTATGGAAGGT ACAGGAATATCCCTAGCACAGTTCATGTCTCCAAGGAGACAGGTTACTTCTGGATTGGCAACAAGGCCCA GGATGCCAAACAATTCCTTCTCCTAATATTTGCACATTAAGCTCTCCGTTGGCATGACAAGTAGTGC CTGTAATAATAATAACCGATCTTATTCAAACATCCAGTAACATCTTTACAGGGTATGAATGAAGGACCC AATAACTCCGTTGGCTTCTCTGCCAGTTCTCCAGTCTCTCAGGCAGATGAGCTCACAGAATTCACCTAGCA GATTAAATATACAACAGCAAAAGCTGAGTCCAAAGATAACAAAGAGATTGCCTCAACTTTAAATGAAAT GATTCAATCTGACAACAGCTCTAGTGTATGGCAACCTCTGGATTACAGGGCTTCTGCATAACAATGACAGA CTTTTCAGATGGAGACAGTAAATACTCTCAAACAGTCACAACTAGTGCAGCTTTTGACAACAACCTGCCG AACAGCAGTTACGGCATGCTGATATAGACACAAGCTGCAAGATGTCTGTCTTGCACAGGCACCTTCCAA

PCIP

SEQ ID NO:127

```
>gi|5729725|ref|NM_006534.1| Homo sapiens nuclear receptor  
coactivator 3 (NCOA3), mRNA
```

GTCTGACGTGGCGGCCGGCGGGCTGCGGGCTGAGCGGGCAGTTTCCGATTTAAAGCTGAGCTGCGAGGA
AAATGGCGCGGGAGGATCAAATACTTGCTGGATGGTGGACTCAGAGACCAATAAAAAATAACTGCTTG
AACATCTTTACTTGTTAGCCAGTTGCTGATGTATATTCAAGATGAGTGGATTAGGAGAAAACTTGGAT
CCAATGGCCAGTGATTACGAAAAACGCAATTTGCCATGTGATCTCCAGGACAAGGCTTACCTGCGAGT
GTGAAAAACGAGACGGGAGCAGGAAAGTAATATATTGAAGAATTTGGCTGAGCTGATATCTGCCAATCT
TAGTGATATTGACAAATTTCAATGTCAAACCAGATAAATGTGCGATTTTAAAGGAAACAGTAAGACAGATA
CGTCAAATAAAGAGCAAGGAAAAACTATTTCCAATGATGATGATGTTCAAAAAGCCGATGTATCTTCTA
CAGGGCAGGAGTTATTGATAAAGACTCCTTAGGACCGCTTTACTTCAGGCATTGGATGTTTCCATT
TGTGGTGAATCGAGACGGAACACTTGTATTTGTATCAGAAAAATGTCAACAATACCTGCAATATAAGCAA
GAGGAACTGGTTACACAAGTGTTTACAATTTCTCATGAAGAAGACAGAAAGGATTTCTTAAGAATT
TACCAAAATCTACAGTTAATGGAGTTTCTTGGACAAATGAGACCCAAAGACAAAAAGCCATACATTTAA
TTGCCGTATGTTGATGAAAAACCCACATGATATTCTGGAAGACATAAACGCCAGTCTGAAATGCGCCAG
AGATATGAAACAATGCAGTGCTTTGCCCTGCTCAGCCACGAGCTATGATGGAGGAAGGGGAAGATTTGC
AATCTTGATGATCTGTGTGGCAGCCGATTAATCAAGGAGAAAGAAACATTTCCATCAGACCTCGAGAG
CTTTATTACCAGATGATCTTTTCAGGAAAGTTGTCAATATAGATACAAATTTCACTGAAATCTTCCATG
AGGCCTGGCTTTGAAGATATAATCCGAAGTGATTCAGAGATTTTTAGTCTAAATGATGGGCAGTCAT
GGTCCCAGAAACGTCACTATCAAGAAGTTACCAGTGATGGGATATTTTCCCCAACAGCTTATCTTAATGG
CCATGCAGAAACCCAGTATATCGATTCTGTTGGCTGATGGAACATAGTGACTGCACAGACAAAAAGC
AAACTCTTCGAAATCCTGTAAACAAATGTCTGCATGGCTTTGCTCAACCCACTTCTCTCAGAGAACAG
AGAATGGATATAGACCAAAACCAATCTCTGTGGACAAGGGATAGACCACTTATGGCTGGATGCAACAG
TTTGGGTAGGCGGCATGAGTATGTCGCCAAACCAAGGCTTACAGATGCCGAGCAGCAGGGCTTATGGCTTG

CTCAGTACCCAGAACAGCCAGTTTACTGTGATTACAGAGCCACAGTCTAACTGAGCACCTTTTAAACCCC
 TCCCTCTTCTGCCCCCTACCACTTTTCTGCTGTTGCCCTCTCTTTGACACCTGTTTGTAGTCAGTTGGGAGG
 AAGGGAAAAATCAAGTTTAAATCCCTTTATCTGGGTTAATTCATTGGTTCAAATAGTTGACGGAATTGG
 GTTCTGAATGTCTGTGAATTTAGAGGTCTCTGCTAGCCTTGGTATCATTCTTAGCAATAACTGAGAG
 CCAGTTAAATTTAAGAATTTACACATTTAGCCCAATCTTTCTAGATGTCTCTGAAGGTAAGATCATTTAA
 TATCTTTGATATGCTTACGAGTAAGTGAATCCTGATTATTTCCAGACCCACCACCAGAGTGGATCTTATT
 TTCAAAGCAGTATAGACAATTATGAGTTTGGCCCTCTTTCCCTACCAAGTTCAAATATATCTAAGAAAG
 ATTGTAATTCGAAAACCTTCCATTGTAGTGGCCTGTGCTTTTCAGATAGTATCTCTCTGTTTGGAGAC
 AGAGGAAGAACAGGTGAGTCTGTCTCTTTTTCAGCTCAATTGTATCTGACCCCTCTTTAAGTTATGTGT
 GTGGGGAGAAATAGAATGGTGCTCTTATGTGCGAC

GRIP1

SEQ ID NO:127

gi|5729857|ref|NM_006540.1| Homo sapiens nuclear receptor coactivator
 2 (NCOA2), mRNA

GGCGGCGCAGCCTCGGCTACAGCTTCGGCGGCGAAGGTGAGCGCCGACGGCAGCCGGCACCTGACGGCG
 TGACCGACCCGAGCCGATTTCTTGGATTGGGCTACACACTTATAGATCTTCTGCACTGTTTACAGGCA
 CAGTTGCTGATATGTGTTCAAGATGAGTGGGATGGGAGAAAATACCTCTGACCCCTCCAGGGCAGAGACA
 AGAAAGCGCAAGGAATGTCTGACCAACTTGGACCCAGCCCCAAAAGGAACACTGAAAAACGTAATCGTG
 AACAGGAAAAATAATATATAGAAGAACTTGCAGAGTTGATTTTGCAAATTTAATGATATAGACAACCTT
 TAACTTCAAACCTGACAAATGTGCAATCTTAAAGAAACTGTGAAGCAAATTCGTGAGTCAAGGAACAA
 GAGAAAGCAGCAGCTGCCAACATAGATGAAGTGCAGAGTCAGATGTATCTCTACAGGGCAGGGTGTCA
 TCGACAAGGATGCGCTGGGGCCTATGATGCTTGAAGGCCCTTGTATGGGTCTTCTTTGTAGTGAACCTGGA
 AGGCAACGTTGTGTTTGTGTGAGAGAATGTGACACAGTATCTAAGGTATAACCAAGAAGAGCTGATGAAC
 AAAAGTGTATATAGCATCTTGCATGTTGGGGACACACGGAATTTGTCAAAAACCTGCTGCCAAAGTCTA
 TAGTAAATGGGGATCTTGGTCTGGCGAACCTCCGAGGCGGAACAGCCATACCTTCAATTGTGCGATGCT
 GGTAAAACCTTTACCTGATTGAGAAGAGGAGGTCATGATAACAGGAAGCTCATCAGAAATATGAAACT
 ATGCACTGCTTCTGCTCTCTCAACCAAGTCCATCAAAGAAGAGGAGAGATTGTCAGTCCCTGCTTGA
 TTTGCGTGGCAAGAGAGTTCCCATGAAGGAAAGACCAGTTCTTCCCTCATCAGAAAGTTTTACTACTCG
 CCAGGATCTCCAAGCAAGATCACGTCTCTGGATACAGCACCATGAGAGCAGCCATGAAACCAGGCTGG
 GAGGACCTGGTAAGAAGGTGATTGAGAAGTTCCATGCGCAGCATGAAGGAGAATCTGTGTCTTATGCTA
 AGAGGCATCATCATGAAGTACTGAGACAAGGATGGCATTGCTCAATCTATCGTTTTTCCCTGTCTGA
 TGGCACTCTTGTGTCTGCACAAACGAAGAGCAAACCTCATCCGTTCTCAGACTACTAATGAACCTCAACTT
 GTAATATCTTTACATATGCTTTCAGAGAGCAGAATGTGTGTGTGATGAATCCGGATCTGACTGGACAAA
 CGATGGGGAAGCCACTGAATCCAATTAGCTCTAACAGCCCTGCCCATCAGGCCCTGTGCACTGGGAACCC
 AGGTCAGGACATGACCCCTCAGTAGCAATATAAATTTCCATAAATGGCCCCAAAGGAACAAATGGGCATG
 CCGATGGGCAGGTTTGGTGGTTCTGGGGGAATGAACCATGTGTGAGGCATGCAAGCAACCACTCCTCAGG
 GTAGTAACATATGCACTCAAATGAACAGCCCTCACAAAGCAGCCCTGGCATGAATCCAGGACAGCCAC
 CTCCATGCTTTACCAAGGCATCGCATGAGCCCTGGAGTGGCTGGCAGCCCTCGAATCCCACCCAGTCAG
 TTTTCCCTGCAGGAAGCTTGCAATCCCTGTGGGAGTTTGCAGCAGCACAGGAATAGCCATAGTTATA
 CCAACAGCTCCCTCAATGCACTTCAGGCCCTCAGCGAGGGGCACGGGGTCTCATTAGGGTCATCGTTGGC
 TTCACAGACCTAAAATGGGCAATTTGCAAAACTCCCACTTAATATGAATCCTCCCCACTCAGCAAG
 ATGGGAAGCTTGGACTCAAAGACTGTTTGGACTATATGGGGAGCCCTCTGAAGGTACAACCTGGCAAG
 CAGAGAGCAGCTGCCATCTTGGAGAGCAAAGGAAACAAATGACCCCAACCTGCCCCCGGCCGTGAGCAG
 TGAGAGAGCTGACGGGCAGAGCAGACTGCATGACAGCAAAGGGCAGACCAAACTCCTGCAGTGTCTGACC
 ACCAAATCTGATCAGATGGAGCCCTCGCCCTTAGCCAGCTCTTGTGCGATACAAACAAAGACTCCACAG
 GTAGCTTGCTTGGTCTGGGTCTACACATGGAACCTCGCTCAAGGAGAAGCATAAAATTTTGACAGACT
 CTTGACAGGACAGCAGTTCCCTGTGGACTTGGCCAAAGTTAACAGCAGAAGCCACAGGCAAGACTGAGC
 CAGGAGTCCAGCAGCAGCTCCTGGATCAGAAGTGACTATTAAACAAGAGCCGGTGAGCCCCAAGAAGA
 AAGAGAAATGCACTACTTCTGCTATTGCTAGATAAAGATGATACTAAAGATATTGGTTTACCAGAAATAAC
 CCCCAACTTGAGAGACTGGACAGTAAGACAGATCTTCCAGTAACACAAATTAATAGCAATGAAAAT
 GAGAAGGAGGAGATGAGCTTTGAGCCTGGTGACAGCCTGGCAGTGAGCTGGACAACCTGGAGGAGATT
 TGGATGATTGCAAGATAGTCAATTACACAGCTTTTCCAGACACGAGGCCAGGCGCCCTGTCTGATG
 AGTTGACAAGCAAGCCATCATCAATGACCTCATGCAACTCACAGCTGAAAACAGCCCTGTACACCTGTT
 GGAGCCAGAAAACAGCACTGCGAATTTACAGAGCACTTTAATAACCCACGACCAGGGCACTGGGCA
 GGTATTGCCAAACAGAAATTTACCACTTGACATCACATTGCAAAGCCCAACTGGTGCTGGACCTTTCCC
 ACCAATCAGAAACAGTAGTCCCTACTCAGTGATACCTCAGCCAGGAATGATGGGTAAATCAAGGATGATA
 GGAACCAAGGAATTTAGGGAACAGTAGACAGGAAGTATGGTAACAGTGTCTCTCGGCTACTATGC
 CATCTGGAGAATGGGCACCGCAGAGTTGGGCTGTGAGAGTCACCTGTGCTGCTACCAACAGTGCCATGAA
 CCGGCCAGTCCAAGGAGGTATGATTCGGAACCCAGCAGCCAGCATCCCATGAGGCCCAGCAGCCAGCCT
 GGCCAAAGACAGACGCTTCACTCTCAGGTGATGAATATAGGGCCATCTGAATTAGAGATGAACATGGGGG
 GACCTCAGTATAGCCAACAACAGCTCCTCAAATCAGACTGCCCCATGGCCTGAAAGCATCCTGCCTAT

AGACCAGGCGTCTTTTGCCAGCCAAAACAGGCAGCCATTTGGCAGTTCTCCAGATGACTTGCTATGTCCA
CATCCTGCAGCTGAGTCTCCGAGTGATGAGGGAGCTCTCCTGGACCAGCTGTATCTGGCCTTGCGGAATT
TTGATGGCCTGGAGGAGATTGATAGAGCCTTAGGAATACCCGAACCTGGTCAGCCAGAGCCAAGCAGTAGA
TCCAGAACAGTTCTCAAGTCAGGATTCCAAATCATGCTGGAGCAGAAGGCGCCGCTTTTCCACAGCAG
TATGCATCTCAGGCACAAATGGCCCAGGGTAGCTATTCTCCCATGCAAGATCCAACTTTACACCATGG
GACAGCGGCCTAGTTATGCCACACTCCGTATGCAGCCCAGACCGGGCCTCAGGCCACGGGCCTAGTGCA
GAACCAGCCAAATCAACTAAGACTTCAACTTCAGCATCGCCTCCAAGCACAGCAGAATCGCCAGCCACTT
ATGAATCAAATCAGCAATGTTTCCAATGTGAACCTGACTCTGAGGCCTGGAGTACCAACACAGGCACCTA
TTAATGCACAGATGCTGGCCCAGAGACAGAGGGAATCCTGAACCAGCATCTTCGACAGAGACAAATGCA
TCAGCAACAGCAAGTTCAGCAACGAACCTTGATGATGAGAGGCAAGGGTTGAATATGACACCAAGCATG
GTGGCTCCTAGTGGTATGCCAGCAACTATGAGCAACCCTCGGATTTCCCAGGCAATGCACAGCAGTTTC
CATTTCCTCCAACTACGGAATAAGTCAGCAACCTGATCCAGGCTTTACTGGGGCTACGACTCCCCAGAG
CCCACTTATGTCACCCCGAATGGCACATACACAGAGTCCCATGATGCAACAGTCTCAGGCCAACCCAGCC
TATCAGGCCCCCTCCGACATAAATGGATGGGCGCAGGGGAACATGGGCGGAACAGCATGTTTCCCAGC
AGTCCCCACCACACTTTGGGCAGCAAGCAACACCAGCATGTACAGTAACAACATGAACATCAATGTGTC
CATGGCGACCAACACAGGTGGCATGAGCAGCATGAACCAGATGACAGGACAGATCAGCATGACCTCAGTG
ACCTCCGTGCCCTACGTGAGGGCTGTCTCCATCGGTTCCCGAGCAGGTTAATGATCCTGCTCTGAGGGGAG
GCAACCTGTTCCCAAACAGCTGCCTGGAATGGATATGATTAGCAGGAGGGAGACACAACACGGAAATA
TTGCTGACACTGCTGAAGCCAGTTGCTTCTTCAGCTGACCGGGCTCACTTGCTCAAAACACTTCCAGTCT
GGAGAGCTGTGCTTATTTGTTTCAACCCAACTGACCTGCCAGCCGGTTCTGCTAGAGCAGACAGGCCTGG
CCCTGGGTTCCAGGGTGGCGTCCACTCGGCTGTGGCAGGAGGAGCTGCCTCTTCTCTTGACAGTCTGAAG
CTCGCATCCAGACTCGCTCAGTCTGTTCCCTGAGTTTCCAGCTTACCTTAGTGCAACTTAGATCTCTCTCCCCA
AGTAAATGTTGACAGGCCAATTTTATACCCATGTGAGATTGAATGTATTTAAATGTATGTATTTAAGGAG
AACCATGCTCTTGTCTGTTTCTGTTCCGTTCCAGACACTGGTTTCTTGCTTTGTTTTCCCTGGCTAACA
GTCTAGTGCCAAAGATTAAGATTTTATCTGGGGGAAAGAAAGAAATTTTTTAAAAAATTAACATAAGAT
GTTTAAAGCTAAAGCCTGAATTTGGGATGGAAGCAGGACAGACACCGTGGACAGCGCTGTATTTACAGAC
ACACCCAGTGCCTGAAGACCAACAAAGTCACAGTCGTATCTCTAGAAAGCTCTAAAGACCATGTTGGAAA
GAGTCTCCAGTTACTGAACAGATGAAAAGGAGCCTGTGAGAGGGCTGTTAACATTAGCAAAATATTTTTTC
CTTGTTTTTTCTTTGTTTAAACCAAACCTGGTTACCTGAATCATGAATTGAGAAGAAATAATTTTCATTT
CTAAATTAAGTCCCTTTTAGTTTGATCAGACAGCTTGAATCAGCATCTCTTCTTCCCTGTGACCTGACT
CTTCCCTTCCCTCTCTCATTCCCCATACTCCCTATTTTCATTCTCTTTTAAAAAATAATATAAGCTAC
AGAAACCAGGTAAGCTAAGCCTTTATTTCTTAAATGTTTGGCCAGCCTTACCAATTGCTAAGTTAGTAATT
TCAGAAAAAATAATGCATTTACTGGCAAGGAGAAGAGCAAAGTTAAGGCTTGATACCAATCGAGCTAAG
GATACCTGCTTTGGAAGCATGTTTATTCTGTTCCCCAGCAACTCTGGCCTCCAAAATGGGAGAAACGCCA
GTGTGTTTTAAATTGATAGCAGATATCACGACAGATTTAACCTCTGCCATGTGTTTTTTATTTTGTTTTTT
AGCAGTGTGACTAAGCCGAAGTTTGTAGGTACATAAAATCCAATTTATATGTAAACAAGCAATAATT
TAAGTTGAGAACTTATGTGTTTTAATTGTATAATTTTTGTGAGGTATACATATTGTGGAATTGACTCAAA
AATGAGGTACTTCAGTATTAAATTAGATATCTTCATAGCAATGTCTCCTAAAGGTGTTTTGTAAAGGATA
TCAATGCCTTGATTAGACCTAATTTGTAGACTTAAGACTTTTTATTTCTAAACCTTGTGATTCTGCTTA
TAAGTCATTTATCTAATCTATATGATATGCAGCCGCTGTAGGAACCAATTTCTGATTTTTATATGTTTTAT
ATTCTTTCTTAATGAACCTTAGAAAGACTACATGTTACTAAGCAGGCCACTTTTATGGTTGTTTTT

ATF-2

SEQ ID NO:128

>gi|4503032|ref|NM_001880.1| Homo sapiens activating transcription
factor 2 (ATF2), mRNA

GAATTCTGTGATAAGTTATTCAACTTATGAAATTCAGTTACATGTGAATTCTGCCAGGCAATACAAGGA
CCTGTGGAATATGAGTGATGACAAACCCTTTCTATGTACTGCGCCTGGATGTGGCCAGCGTTTTACCAAC
GAGGATCATTGGCTGTCCATAAAACATAAACATGAGATGACACTGAAATTTGGTCCAGCAGCTAATGACA
GTGTCATTGTGGCTGATCAGACCCCAACACCAACAAGATTCTTGAAAACTGTGAAGAAGTGGGTTTGTT
TAATGAGTTGGCGAGTCCATTTGAGAATGAATTCAGAAAGCTTCAGAAGATGACATTAAAAAATGCCT
CTAGATTTATCCCTCTTGCAACACCTATCATAAGAAGCAAAATTGAGGAGCCTTCTGTTGTAGAAACAA
CTCACCAGGATAGTCCTTTACCTCACCAGAGTCTACTACCAGTGATGAGAAGGAAGTACCATTGGCACA
AAGTCACAGCCCACTCAGCTATTGTTTCGTCCAGCATATTACAGGTTCCCAATGTGCTGCTTACAAGT
TCTGACTCAAGTGTAATTATTTCAGCAGGCAGTACCTTCACCAACCTCAAGTACTGTAATCACCAGGCAC
CATCCTCTAACAGGCCAATTGTCCCTGTACCAGGCCATTTCTCTTCTGTTACATCTTCCCTAGTGGACA
AACCATGCCTGTTGCTATTCTTCGATCAATTACAAGTTCTAATGTGCATGTTCCAGCTGCAGTCCCCTC
GTTCCAGCAGTCAACATGGTGCCTAGTGTTCAGGAATCCCAGGTCTCTCTCTCCCCAACCACTACAGT
CAGAAGCAAAAATGAGATTAAAGAGCTGCTTTGACCCAGCAACATCTCCAGTTACCAATGGTGATGACTGT
CAAAGGTGATGGTAGCGGATTGGTTAGGACTCAGTCAGAGGAATCTCGACCGCAGTCATTACAACAGCCA
GCCACATCCACTACAGAACTCCGGCTTCTCCAGCTCACACAACCTCCACAGACCCAAAGTACAAGTGGTC
GTCGGAGAAGAGCAGCTAACGAAGATCCTGATGAAAAAAGGAGAAGTTTTTAGAGCGAAATAGAGCAGC

AGCTTCAAGATGCCGACAAAAAGGAAAGTCTGGGTTCTAGTCTTTAGAGAAGAAAGCTGAAGACTTGAGT
 TCATTAATAGGTGCTGAGTGCAGAGTGAAGTCAACCTGCTGAGAAATGAAGTGGCACAGCTGAAACAGCTTC
 TTCTGGCTCATAAAGATTGCCCTGTAACCGCCATGCAGAAGAAATCTGGCTATCATCTGCTGATAAAGA
 TGATAGTTCAGAAGACATTTAGTGCCGAGTAGTCCACATACGGAAGCTATACAGCATAGTTCCGTCAGC
 ACATCCAATGGAGTCAGTTCAACCTCCAAGGCAGAAAGCTGTAGCCACTTCAGTCTCACCAGATGGCGG
 ACCAGAGTACAGAGCCTGCTCTTTCACAGATCGTTATGGCTCCTTCTCCAGTCACAGCCCTCAGGAAG
 TTGATTAAAAACCTGCAGTACAACAGTTTAGATACTCATTAGTGACTTCAAAGGGAAATCAAGGAAAGAC
 CAGTTTCCATTTATGCGAAATCTGTGGTTGTAAATTT

GNAT related

HAT1

SEQ ID NO:129

>gi|4504340|ref|NM_003642.1| Homo sapiens histone acetyltransferase 1 (HAT1), mRNA

CGTCCTTCCTCAGCCGCGGTGATCGTAGCTCGGAAATGGCGGGATTGGTGCTATGGAGAAATTTTGG
 TAGAATATAAGAGTGCAGTGGAGAAGAACTGGCAGAGTACAAATGTAACCAACACAGCAATTGAACT
 AAAATTAGTTCGTTTCTCTGAAGATCTTGAAATGACATTAGAACTTCTTCTGAGTATACCCATCAA
 CTCTTTGGGGATGATGAAACTGCTTTTGGTTACAAGGGTCTAAAGATCCTGTTATACTATATTGCTGGTA
 GCCTGTCAACAATGTTCCGTGTTGAATATGCATCTAAAGTTGATGAGAACTTTGACTGTGTAGAGGCAGA
 TGATGTTGAGGCAAAATTAGACAAATCATTCCACCTGGATTTTGCAAAACACGAATGATTTCCTTTCT
 TTACTGGAAAAGGAAGTTGATTTCAAGCCATTGGAACCTTACTTCATACCTACTCAGTTCTCAGTCCAA
 CAGGAGGAGAAAACCTTTACCTTTTCAGATATATAAGGCTGACATGACATGTAGAGGCTTTTCGAGAATATCA
 TGAAAGGCTTCAGACCTTTTGTATGTGGTTTATTGAAACTGCTAGCTTTATTGACGTGGATGATGAAAGA
 TGGCACTACTTTCTAGTATTTGAGAAGTATAATAAGGATGGAGCTACGCTCTTTCGACCGTAGGCTACA
 TGACAGTCTATAATTACTATGTGTACCCAGACAAAACCCGCCACGTGTAAGTCAGATGCTGATTTTGAC
 TCCATTTCAAGTCAAGGCCATGGTGCTCAACTTCTTGAAACAGTTCATAGATACTACACTGAATTTCTCT
 ACAGTTCCTTGATATTACAGCGGAAGATCCATCCAAAAGCTATGTGAAATTACGAGACTTTGTGCTTGGA
 AGCTTTGTCAAGATTTGCCCTGTTTTTCCGGGAAAAATTAATGCAAGGATTCAATGAAGATATGGCGAT
 AGAGGCACAACAGAAGTTCAAAATAAATAAGCAACACGCTAGAAGGGTTTATGAAATCTTCGACTACTG
 GTAACCTGACATGAGTGATGCCGAACAATACAGAAGCTACAGACTGGATATTAAGAAGACTAATTAGCC
 CATATAAGAAAAAGCAGAGAGATCTTGCTAAGATGAGAAAAATGTCTCAGACCAGAAGAACTGACAAACCA
 GATGAACCAAAATAGAAATAAGCATGCAACATGAACAGCTGGAAGAGAGTTTTTCAGGAACCTAGTGGAAGAT
 TACCGCGCTGTTATTGAACGACTTGCTCAAGAGTAAAGATTATACTGCTCTGTACAGGAAGCTTGCAAAT
 TTTCTGTACAATGTGCTGTGAAAAATCTGATGACTTTAATTTTAAATCTTGTGACATTTTGCTTATACT
 AAAAGTTATCTATCTTTAGTTGAATATTTCTTTTGGAGAGATTGTATATTTTAAATACTGTTTAGAGT
 TTATGAGCATATATTGCATTTAAAGAAAGATAAAGCTTCTGAAATACTACTGCAATTGCTTCCCTTCTTA
 AACAGTATAATAAATGCTTAGTTGTGAT

Table 6 ATP-dependent Chromatin Remodelling.

SMARCA5

SEQ ID NO:130

>gi|4507074|ref|NM_003601.1| Homo sapiens SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 5 (SMARCA5), mRNA

GCGGAAGAGCAGAACGTTGGGAGTGTGCAGTCTCTGGGCCCCGGCTCAGGCCCGTCGCGGAGGCGCGGCG
 CAGGGGAGCGCTCGGGTGGGAGTCTCGCTCCTCCACAGTTTATTGCGACGTAGCATCCAGGCCTAGGCC
 TCCCGTCCATCCCGCCGACTCGGGCCTCTGGCAGCAGCGGGTGACGCAGACGGAACATCATGTCTGTC
 CGCGGCGGAGCTCCGCCACCCCGCTCCCGAGAGCGCGCTTCCAAGCCCGCAGCCTCGATCGCCAGC
 GCGGGGAGCAACAGCAGCAACAAAGGCGGCCCGAAGGCGTCCGCGCGCAGCGGTTGCGTCTGCGGCCA
 GCGCTGGTCCCGCAGACGCGGAGATGGAGGAAATATTGATGATGCGTCACCTGGAAAGCAAAAGGAAAT
 CCAAGAACCAGATCTTACCTATGAAGAAAAATGCAAACTGACCGGGCAATAGATTGAGATATTTATTA
 AAGCAGACAGAACTTTTGCACATTTCACTCAACCTGCTGCTCAGAAGACTCCAACCTTCACCTTTGAAGA
 TGAACCCAGGGGCCCAAGAAATAAAAAAGATGAGAAGCAGAACTTACTATCCGTTGGCGATTACCGACA
 CCGTAGAACAGAGCAAGAGGAGGATGAAGAGCTTAAACAGAAAGCTCCAAGCAACCAATGTTTGCACT
 CGATTTGAAGACTCTCCATCGTATGTAATGGGGTAACTGAGAGATTATCAGGTCCGAGGATTAACT

[illegible]

SMARCA4

SEQ ID NO:132

>gi|4507072|ref|NM_003072.1| Homo sapiens SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 4 (SMARCA4), mRNA

TTCCGGCGGGGAGGCGCGGGAAGTCGATGGCGCGGGCGCTCTGCAGGAGGCCACTGTCTGCAGCTC
CCGTGAAGATGTCCACTCCAGACCCACCCCTGGGCGGAAGTCTCGGCCAGGTCTTCCCCGGGCGCTGG
CCCTTCCCCTGGAGCCATGCTGGGCCCTAGCCCGGGTCCCTCGCCGGGCTCCGCCACAGCATGATGGGG
CCCAGCCCAGGGCCGCCCTCAGCAGGACACCCCATCCCCACCCAGGGGCTGGAGGGTACCCTCAGGACA
ACATGCACCCAGATGCACAAGCCCATGGAGTCCATGTCATGAGAAGGGCATGTGCGACGACCCGCGCTACAA
CCAGATGAAAGGAATGGGGATGCGGTGAGGGGGCCATGTGGGATGGGGCCCCCGCCAGCCCCATGGAC
CAGCACTCCCAAGGTACCCCTCGCCCCCTGGGTGGCTCTGAGCATGCCTCTAGTCCAGTTCAGGCCAGTG
GCCCCGTCTTCGGGGCCCCAGATGTCTTCGGGGCCAGGAGGTGCCCCGCTGGATGGTGTGACCCCCAGGC
CTTGGGGCAGCAGAACCAGGGGGCCCAACCCCATTTAACAGAACAGCTGCACCAGCTCAGAGCTCAGATC
ATGGCCTACAGATGCTGGCCAGGGGGCAGCCCCCTCCCGACCACTGTCAGATGGCGGTGAGGGCAAGC
GGCCGATGCCCGGATGTCAGCAGCAGATGCCAACGCTACCTCCACCCTCGGTGTCCGCAACAGGACCCGG
CCCTGGCCCCCTGGCCCCGGCCCCGGGTCCCGGCCCGGCACCTCCAAATTACAGCAGGCCTCATGGT
ATGGGAGGGGCCAACATGCCTCCCCAGGACCCCTCGGGCGTGCCCCCGGGATGCCAGGCCAGCCTCCTG
GAGGGCTTCCCAAGCCCTGGCCTGAAGGACCCATGGCGAATGCTGCTGCCCCACAGCAGCCCTCAGAA
GCTGATTCCCCCGCAGCCAAAGGGCGCCCTTCCCGCGCCCCCTGCCGTCCACCCGCGCTCGCCC
GTGATGCCACCGCAGACCCAGTCCCCCGGGCAGCCGGCCCCAGCCCGCGCCCATGGTGCCACTGCACCAGA
AGCAGAGCCGCATACCCCCATCCAGAAGCCGCGGGGCTCGACCCTGTGGAGATCCTGCAGGAGCGCGA
GTACAGGCTGCAGGCTCGCATCGCACCCGAATTCAGGAACCTGAAAACCTTCCCGGGTCCCTGGCCGGG
GATTTCGGAACCAAGCGACCATTTGAGCTCAAGGCCCTCAGGCTGCTGAACCTTCCAGAGGCAGTGCGCC
AGGAGTGGTGGTGTGTCATGCGGAGGACACAGCGCTGAGAGACGCCCTCAATGCTAAGGCTACAAGCG
CAGCAAGCGCCAGTCCCTGCGCGAGGCCCGCATCACTGAGAAGCTGGAGAAGCAGCAGAAGATCGAGCAG
GAGCGCAAGCGCCGCGCAGAAGCACCAGGAATACCTCAATAGCATTCTCCAGCATGCCAAGGATTTCAAGG
AATATCACAGATCCGTACAGGCAAAATCCAGAAGCTGACCAAGGCAGTGGCCACGTACCATGCCAACAC
GGAGCGGGAGCAGAAGAAAGAGAACGAGCGGATCGAGAAGGAGCGCATGCGGAGGCTCATGGCTGAAGAT
GAGGAGGGGTCCCAAGCTCATCGACCAAGAGAACAGCGCTGGCCCTACCTCTTGCAGCAGACAG
ACGAGTACGTGGCTAACCTCACGGAGCTGGTGCCGACGACAAGGCTGCCCAGGTCCGCAAGGAGAAAA
GAAGAAAAAGAAAAAGAAAGAGGAGCAGAAATGCAGAAGGACAGACGCTGCCATTGGGCCGGATGGCGAG
CCTCTAGACGAGACCAGCCAGATGAGCGACCTCCCGGTGAAGGTGATCCACGTGAGAGTGGGAAGATCC
TCACAGGCACAGATGCCCCCAAAGCCGGGCAGCTGGAGGCTGGCTCGAGATGAACCCGGGGTATGAAGT
AGCTCCGAGGTCTGATAGTGAAGAAAGTGGCTCAGAAAGAGGAAGAGGAGGAGGAGGAAGAGCCG
CAGGCAGCACAGCCTCCACCCCTGCCGTGGAGGAGAAGAAAGATTCCAGATCCAGACAGCGATGACG
TCTCTGAGGTGGACGCGCGGCACATATTGAGAATGCCAAGCAAGATGTCGATGATGAATATGGCGTGTG
CCAGGCCCTTGACGTGGCCTGCAGTCTACTATGCCGTGGCCCATGCTGTCACTGAGAGAGTGGACAAG
CAGTCAGCGCTTATGGTCAATGGTGTCTCTCAAACAGTACCAGATCAAAGGTTTGGAGTGGCTGGTGTCCC
TGTACAACAACAACCTGAACCGGCATCTGGCCGACGAGATGGGCCCTGGGGAAGACCATCCAGACCATCGC
GCTCATCACGTACCTCATGGAGCACAACGCATCAATGGGCCCTTCTCATCATCGTGCCTCTCTCAACG
CTGTCCAACCTGGGCGTACGAGTTTGACAAGTGGGCCCCCTCCGTGGTGAAGGTGTCTTACAAGGGATCCC
CAGCAGCAAGACGGGCCTTTGTCCCCAGCTCCGGAGTGGGAAGTTCAACGCTCTTGCTGACGACGTACGA
GTACATCATCAAAGACAAGCACATCTCGCCAAGATCCGTTGGAAGTACATGATTGTGGACGAGGTACAC
CGCATGAAGAACCACCACTGCAAGCTGACGCAAGGTGCTCAACACGCACTATGTGGCACCCCGCCTGCG
TGCTGACGGGCACACCGCTGCAGAACAGCTTCCCGAGCTTGGGCGCTGCTCAACTTCTGTGCTGCCAC
CATCTTCAAGAGCTGCAGCACCTTCGAGCAGTGGTTTAAACGACCCCTTTGCCATGACCGGGGAAAAGGTG
GACCTGAATGAGGAGGAAACCATTTCTCATCATCCGGCGTCTCCCAAAGTGTGCGGCCCTTCTGTCTCC
GACGACTCAAGAAGGAAGTCAAGGCCAGTTGCCCGAAAAGGTGGAGTACGTATCAAGTGCAGATGTC
TGCGCTGCAGCGAGTGCTTACCGCCACATGCAGGCCAAGGGCGTGCTGCTGACTGATGGCTCCGAGAAG
GACAAGAAGGGCAAAGGCGGCACCAAGACCCCTGATGAACACCATCATGCAGCTGCGGAAGATCTGCAACC
ACCCCTACATGTTCCAGCACATCGAGGAGTCTTTTCCGAGCACTGGGGTTCACTGGCGGCATTGTCCA
AGGGCTGGACCTGTACCGAGCCTCGGGTAAATTTGAGCTTCTTGATAGAATTCTTCCCAAACCTCCGAGCA
ACCAACCACAAAGTGCTGCTGTTCTGCCAAATGACCTCCCTCATGACCATCATGGAAGATTACTTTGCGT
ATCGCGGCTTTAAATACCTCAGGCTTGATGGAACCAAGGCGGAGGACCGGGCATGCTGCTGAAAAC
CTTCAACGAGCCCGGCTCTGAGTACTTCTCTTCTGCTCAGCACCCGGGCTGGGGGGCTCGGCCTGAAC
CTCCAGTCGGCAGACACTGTGATCATTTTTCAGAGCGACTGGAATCCTCACCAGGACCTGCAAGCGCAGG
ACCGAGCCCACCGCATCGGGCAGCAGAACGAGGTGCGTGTGCTCCGCCTCTGCACCGTCAACAGCGTGGA
GGAGAAGATCTTACGTGCAGCCAAGTACAAGCTGAGTGGACCAAGGATGATCCAGGCCGCGCATGTTT
GACCAGAGTCTCTCCAGCCATGAGCGGCGCCCTTCTGCAAGCCATCCTGGAGCAGGAGGACGATG
AGAGCAGACACTGCAGCACGGGCAGCGGCAGTGCCAGCTTCGCCACACTGCCCTCCGCCAGCGGGCGT
CAACCCGACTTGGAGGAGCCACTCTAAAGGAGGAAGACGAGGTGCCCGACGACGAGACCGTCAACCAG
ATGATCGCCCGCAGGAGGAGCTTTGATCTGTTTATGCGCATGGACCTGGACCGCAGGCGGAGGAGG
CCCGCAACCCCAAGCGGAAGCCGCGCCTCATGGAGGAGGACGAGCTCCCTCGTGGATCATCAAGGACGA
CGCGGAGGTGGAGCGGCTGACCTGTGAGGAGGAGGAGGAGAAGATGTTCCGGCGTGGCTCCCGCCACCGC

AAGGAGGTGGACTACAGCGACTCACTGACGGAGAAGCAGTGGCTCAAGGCCATCGAGGAGGGCACGCTGG AGGAGATCGAAGAGGAGGTCCGGCAGAAAGAAATCATCACGGAAGCGCAAGCGAGACAGCGACGCCGGCTC CTCCACCCCGACCCAGCAGCCCGCAGCCGCGACAAGGACGACGAGAGCAAGAGCAGAAGAAGCGCGGG CGGCCGCTGCGGAGAACTCTCCCTAACCCACCCAACTCACCAGAAAGATGAAGAAGATTGTGGATG CCGTGATCAAGTACAAGGACAGCAGCAGTGGACGTCAGCTCAGCGAGGTCTTCATCCAGCTGCCCTCGCG AAAGGAGCTGCCCCGAGTACTACGAGCTCATCCGCAAGCCCGTGGACTTCAAGAAGATAAAGGAGCGCATT CGCAACCACAAGTACCGCAGCCTCAACGACCTAGAGAAGGACGTCTGCTCCTGTGCCAGAACGCACAGA CCTTCAACCTGGAGGGCTCCCTGATCTATGAAGACTCCATCGTCTTGACGTCCGGTCTTCACCAGCGTGGC GCAGAAATCGAGAAGGAGGATGACAGTGAAGGCGAGGAGAGTGAGGAGGAGGAAGAGGGCGAGGAGGAA GGCTCCGAATCCGAATCTCGGTCCGTCAAAGTGAAGATCAAGCTTGGCCGGAAGGAGAAGGCACAGGCC GGCTGAAGGGCGGCCGGCGGCGGCGGAGCCGAGGGTCCCGAGCCAAGCCGGTCTGTGAGTGACGATGACAG TGAGGAGGAACAAGAGGAGGACCGCTCAGGAAGTGGCAGCGAAGAAGACTGAGCCCCGACATTCCAGTCT CGACCCCGAGCCCCTCGTTCCAGAGCTGAGATGGCATAGGCCTTAGCAGTAACGGGTAGCAGCAGATGTA GTTTCAGACTTGGAGTAAACTGTATAAACAAAGAATCTTCCATATTTATACAGCAGAGAAGCTGTAGG ACTGTTTGTGACTGGCCCTGTCTGGCATCAGTAGCATCTGTAACAGCATTAAGTGTCTTAAAGAGA
SMARCA3
SEQ ID NO:133
>gi 4507070 ref NM_003071.1 Homo sapiens SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 3 (SMARCA3), mRNA
ATTCCCGGGGTCTGACTGGACTCGCGGCGACTTACCTTTCAGTCTGTCGCTCCTGATCCGGCGCTCGGAA TTTGTCCCCGGCTTCAGGGCTGCGGGGCTGGAAGGAGGCGTATCGAGGCGCTCGAAAACGATCCAGGG GAGCCGAGGCGCTCCTCTTGTCTATCCACTCAGCGCCATGTCTGGATGTTCAAGAGGGATCCAGTTGG AAGTACTTGCAGACTGTCCAGTATGGAGTTCATGGAAATTTTCCACGCCCTCTCATATCCAATTTCTTTC CACGTTTTGAATTCAGATGTTATCCCTCCAGATGACTTTCTAACTAGTGATGAAGAAGTAGATTCCGT TTTATTTGGAAGTTTGAGAGGTCTATGTGGTTGGACTACGCTATTACACGGGAGTAGTTAATAATAATGAA ATGGTTGCATTACAACGAGATCCTAATAACCTTATGATAAGAATGCAATTAAAGTAAACAATGTGAATG GAAATCAAGTTGGCCATTTAAAGAAAGAGCTTGCAGGTGCTTTGGCCTATATCATGGACAACAAATTTGGC ACAAATTGAAGGGTAGTTCTTTTGGTGCAACAATGCTTTTACCATGCTCTGCATATGACTTTTGG GGAAAAGAAGAAATAGAAAAGCGGTTTCAGATGAGTTGAAGAAACATGGATTAAATTTGGGTCTTCGCAC CAAAAATTTAGGATTCAATTTGGAAGTGGTTGGGGCTCTGGAAGAGCTGGACCAAGCTATAGTATGCC AGTGCATGCTGCAGTACAGATGACAACGAGCTTAAACAGAAATTGACAAATTTGTTGAAGATTTA AAAGAAGATGATAAAACCCATGAAATGGAACAGCTGAGGCTATTGAAACACCACTGCTTCCACATCAAA AACAAGCTCTAGCTTGGATGGTGTACGGGAAATAGCAAGAAGTCCACCATTTCTGGGAACAGCGAAA TGACTTATACTATAACACAATAACAAATTTTCTGAGAAGGACCGACAGAAATGTCCATGGAGGAATT TTAGCTGATGATATGGGTTTGGGTAAACTCTTACAGCCATTGCAGTAATCCTTACCAACTTCCATGATG GCAGACCTCTTCTTATTGAAAGAGTTAAAAAGAATCTACTGAAGAAGGAATATAATGTTAACGATGACTC TATGAAACTTGGAGGAAACAATACCAGTGAAAAGGAGATGGACTTAAGCAAAGACGCATCTAGATGTAGT GAACAACCCAGTATTTAGATATCAAGGAGAAGTGAAGTTTGCATGTGAGAAATGTCTACGTCCCGCC CCAAAAGAAGAAAACTGCTGTCCAGTACATAGAAAGCAGTGATTCAGAGGAAATTGAAACAAGTGAATT GCCGCAGAAAAATGAAAGGCAAACTGAAAAATGTACAGTCTGAAACTAAAGGCAGGGCGAAAGCAGGATCT TCTAAGGTTATAGAAGATGTGGCATTTCATGTGCATTAACTTCATCTGTTCTTACAACAAAAAGAAAA TGTTGAAAAAGGAGCTTGTGTCAGTGGAGGGGTCAAAGAAACTGATGTTGAGGAGAGACCAAGAACAAAC ACTGATCATCTGTCCGCTTTCTGTGTTAAGCAAACTGGATTGACCAGTTTGGACAACATATAAAATCAGAT GTACACTTGAATTTTATGTTTATTATGGTCTGATCGTATTAGAGAACCAGGCTTACTTTCAAACAGG ATATTGTTTGTACTACGTATAATATTTAACTCATGACTATGGAATAAAGGAGATAGTCCATTACATAG CATAAGGTGGCTAAGAGTGATCCTGGATGAAGGACATGCCATACGAAATCCAAATGCTCAGCAGACAAAA GCTGTACTTGACTTAGAATCAGAAAGAAGATGGGTTTGGACAGGTACTCCAATCCAGAAATCTTTAAAGG ACTTGTGGTCTCTTCTTCTTTTAAACTTAAACCAATTTATGATAGAGAATGGTGGCATAGAACAAAT ACAGCGTCTGTGACAAATGGGAGATGAAGGAGGACTTAGGCGTTTACAGTCCCTAATTAATAATATTACA CTTAGAAGAACAAAGACAAGCAAAATTAAGGAAAACTGTTTGGAGTTACCAGAACGTAAGTATTTA TTCAGCACATTACACTTTTCAATGAAGGAGTGTCTTGGCACATTATGCAGATGTCTGGGTCTTTTGCTTAGA CTGCCGCAAAATTTGTTGCCATACCTTACCTTCAAAATGCAGTGTCTTCCAATGGCCCCCTCAGGAAATG ATACACCTGAAGAACTGAGAAAGAAGTTAATAAGGAAGATGAAGTTAATTCTGAGCTCAGGTTCAAGATGA GGAATGTGCAATTTGCTGAGTCTTTAACAGTTCCTGTGATAACACATTGTGCACATGTATTTGTAAA CCCTGTATTTGCCAAGTCATTGAGATGAGCAGCCACATGCTAAATGCCCTTTATGCAGAAATGATATAC ATGAAGATAAATTTATAGAATGTCTCCAGAAAGATTGACCGTGACAGTGAGAAAAAGTCTGATATGGA ATGGACATCCAGTTCAAAGATTAAATGCGCTAATGACGCAATGACTGACTTAAGAAAGAAGAAATCCCAAC ATAAAAAGTTTGGTTGTTTCTCAGTTTACAACATTCCTGTCTTTAATAGAAATACCACTTAAAGCCTGTG GATTGTGTTTACTCGTTTGGATGGTTCCATGGCCCAAAAGAAAGAGTTGAATCAATTCAGTGTTTTCA

AAACACTGAAGCAGGATCTCCAACATAATGCTTCTGTCTTAAAGCAGGTGGAGTTGGTTTGAATCTG
TCTGCAGCTTCTCGAGTGTTTTTAATGGATCCAGCCTGGAATCCTGCTGCTGAAGATCAGTGCTTTGACA
GATGCCATAGACTTGGTCAGAAGCAAGAAGTTATCATCACAAAATTCATTGTAAAGGACTCTGTTGAAGA
AAATATGCTGAAAATACAAAACAAAAGAGAGAACTTGCAGCAGGAGCCCTTTGGAACATAAAAAACCAAT
GCTGACGAAATGAAAACAGGCCAAAATTAATGAAATCAGAACATTAATTGACTTATAATTTGTGGGATTTT
AGTAAGAAGACTACTATATGTGAGAGGCGTGATATCTGGATGGAAGTTGGGCTGGATGATCTCCAAAGTC
GTTTCAACTCTTAAAGACATCTTAATCCTGAATGTAAACAATTGTTATGTGTTTGAATCAGAATTGAT
TTTGAACCTTGAGTAATTCATCCTTACAGCTATCTGTAGAATTAGTCATCTTTTTTCTT
<u>SMARCAL1</u>
SEQ ID NO:134
>gi 7657149 ref NM_014140.1 Homo sapiens SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a-like 1 (SMARCAL1), mRNA
GCTGGGTTGGA AAAAGACTATGTTAGCAAGTGTACGCCATGCTTTTGCCAACTTTCCAATTAAAGGTTG
ACATTCCTGCATAAAACATTTCTCTGTGAAAATGTCCTTGCCCTCTTACAGAGGAGCAGAGGAAAAAGATTG
AAGAGAATCGACAAAAGGCTCTGGCCCGCAGAGCTGAGAAGTTATTGGCAGAACAGCATCAGAGGACTAG
CTCGGGCACCTCCATTGCTGGCAACCCATTCCAGGCCAAGGCCCATCCCAAAATTTCCCAAGGGAG
TCTGTAAAGCCAGTGAGCCATGGTGTCAATTTTCAAGCAACAGAATCTCAGTAGCTCATCTAATGCTGACC
AAAGACCTCATGATTCCCACAGTTTTCAGGCCAAGGGGAATATGGAAAAAGCCAGAAGAAATGCCACAGC
CTGCCAGGCCACAGTCCACGTAGTCAAATGACTCTCACTGGAATCTCTCCTCCCTTGGCACAAGTCTCT
CCAGAGGTCCCTAAACAACAGCTCTTGAGTTATGAGTTAGGTCAAGGTCTATGCTCAGGCTTCACTTGAGA
TCAGGTTCAACCCCTTTGCTAACCCAACTCATAAGCCTCTGGCCAAACCAAGAGTTCCCAAGAGACACC
AGCTCATTCCTCTGGACAGCCTCCAGGGATGCTAAGTTAGAGGCCAAGACAGCAAAAGCCTCCCTTCG
GGGCAGAACATTTCTTACATCCATTCTAGCTCAGAGAGTGTAACGCCCAGGACAGAAGGAAGACTCCAGC
AGAAGTCAGGGTCTCAGTCCAAAAGGAGTGAATCTCAGAAGGGAAAGTGCGTAAGGAACGGCGATCG
TTTCCAGGTGTTGATTGGGTACAATGCGGAACCTATTGCAGTGTTTAAAGACCTTGCCAGCAAGAAATTAT
GATCCTGACACCAAGACGTGGAACCTCAGCATGAATGACTATAGTGCCCTGATGAAAGCAGCCCAGAGCC
TCCCCACGGTCAACCTGCAGCCTCTGGAATGGGCCTATGGGAGCAGCGAGTCACCTCCACCAGCAGTGA
GGGACAGGCCGGCCTTCCATCAGCTCCATCCCTTTTCAATTTGTCAAAGGGCGAGGCATGCTCATCTCCAGG
GCCTACTTCGAGGCAGACATCAGTTATTACAGGACCTTATTGCGCTTTTTTAAACAGATGGATTCCAGAA
GATATGATGTCAAGACCAGGAAGTGGAGCTTTCTCTTGGAAGAGCACAGTAAACTAATTGCAAAGGTGCG
CTGCCCTCCCAAGTTTCAAGTGGACCTCTGCCACGACTCTCACCCTGGCGTTTGCTTCTCAGTCAAG
AAGACATCTCTCAGTCTCAGGCCAGATGTCCAGAGGCAGACCTTTCTGAAGTGGACCCCAAGCTCGTGT
CTAATCTGATGCCCTTTCAGAGAGCTGGAGTCAATTTTGCCATAGCCAAAGGAGGCCGCTGCTGCTCGC
TGACGACATGGGCCTGGGGAAGACCATCCAAGCCATCTGCATCGCAGCCTTTTACCGGAAGGAGTGGCCG
CTCCTGGTGGTGGTGCCATCTCCGTGCGCTTACCTGGGAGCAGGCCTTCTTCCGTGGCTGCCATCTC
TGAGCCCAGATTGCATCAACGTCGTGGTGACTGGGAAGGACCGCTGACAGCTGGCCTGATCAACATTGT
CAGCTTTGACCTTCTTAGCAAGTTGGAAAAACAGCTAAAAACCCCTTTTAAAGTTGTTCATCATTTGATGAA
TCTCACTTCTCTCAAAAACAGTAGGACTGCCCGCTGTGAGCAGCTATGCCGGTCTTAAAGGTCGCCAAGA
GGGTGATCCTGTTGTGCGGCACACCAGCCATGTCCCGGCCCGCAGAGCTCTACACGCAGATCATCGCAGT
CAAGCCAACCTTTCTTCCCCAGTTTCATGCCTTTGGACTTCGCTACTGTGATGCCAAACGGATGCCCTGG
GGGTGGGACTACTCAGGTTCTCTCAACCTGGGAGAGCTGAAGCTCCTGCTGGAGGAAGCAGTCATGCTGC
GGCGCCTCAAGTCCGACGTCTTTTCCCAGCTGCCCTGCCAAGCAGCGCAAGATAGTGGTGATTGCCCCAGG
ACGGATCAATGCCAGGACCAGAGCTGCCCTGGATGCTGCAGCCAAGGAAATGACCACCAAGGACAAAAT
AAACAGCAGCAGAAAGATGCCCTCATTCTCTTCTTCAACAGAACAGCTGAAGCTAAAATCCCATCTGTCA
TTGAATATATCTTGGACCTACTGGAAGAGTGGAAAGAGAGAAGTTTTTAGTATTTGCACACCATAAGGTGGT
CCTGGACGCAATTACGCAAGAGCTTGAGAGAAAGCAGCTGCAGCACATCCGCATCGATGGCTCCACCTCA
TCAGCTGAGCGGGAGGACCTGTGCCAGCAGTTTCCAATGTGCGAGAGGCATGCTGTGGCCGTGCTGTCCA
TCACCGCTGCCAATATGGGCCTCACCTTCTCCTCGGCTGACCTGGTGGTGTGTTGCTGAGCTGTTTTGGAA
CCCAGGGGTGCTGATCCAGGCTGAGGACCGCGTGCACCGCATTGGACAGACCAGCTCCGTGGGCATTAC
TACCTCGTGGCAAAGGGCACAGCTGATGACTACCTTTTGGCCCCTGATTCAAGAGAAGATTAAAGTTCTGG
CAGAAGCCGGGCTTTCTGAGACCAATTTTTCAGAAATGACAGAATCCACTGATTACCTCTACAAGGACCC
AAAGCAGCAGAAAGATGTACGACCTATTCCAGAAGTCTTTGAGAAAGAAGGAAGTGTATGGAGCTCGTG
GAAGCAGCAGAGTCTTTTGACCCAGGAAGTGGTTTCAGGAACATCTGGAAGTAGTTCCAGAACATGGGAG
ACACCTGGATGAAAGCTCATTGACAGCCAGTCCACAGAAGAAAAGGAGATTTGAATTTTTTGATAACTG
GGACAGCTTTACGTCTCCCTGTAAAAGGGGCAAAAAAAAAAAAAAAAAAGCATTTTAAATCAAAAAG
AAAAAATAAAA

SMARCA1

SEQ ID NO:135

>gi|4507066|ref|NM_003069.1| Homo sapiens SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 1 (SMARCA1), mRNA

CAAGACTGGAAGCAGAGAGAGAGCAAGAGTGAGAGAGAGCGAGCGAGCGTAGTCAGGAGATGGTGTG
TATTCCAGGAGAAAAACGTTTCTTCATTTCAACTCAAACCTGCTGCTAAAGCGCTAAATCTGAAAAGGA
AATGGACCCAGAATATGAAGAGAAAATGAAAGCCGACCGAGCAAAGAGATTGAAATTTTACTGAAGCAG
ACAGAACTTTTGCACATTTCAATTCAGCCTTCAGCACAGAAATCTCCAACATCTCCACTGAACATGAAAT
TGGGACGTCCCCGAATAAAGAAAGATGAAAAGCAGAGCTTAATTTCTGCTGGAGACTACCGCCATAGGCG
CACAGAGCAAGAAGAAGATGAAGAGCTACTGTCTGAGAGTCCGAAAACATCTAATGTGTGTATTAGATTT
GAGGTGTCACCTTCATATGTGAAAGGGGGGCCACTGAGAGATTATCAGATTCGAGGACTGAATTGGTTGA
TCTCTTTATATGAAAATGGAGTCAATGGCATTTTGGCTGATGAAATGGGCCCTTGGGAAAACCTTTACAAAC
AATTGCTTTGCTTGGTTACCTGAAACACTACCGAAATATCTCTGGACCTCACATGGTTTTAGTTCCAAAG
TCTACTTTACACAACCTGGATGAATGAAATTAACGATGGGTCCCATCTCTCCGTGTCATTTGTTTTGTGCG
GAGACAAGGATGCCAGAGCTGCTTTTATTCGTGATGAAATGATGCCAGGAGAGTGGGATGTTTGGCTTAC
TTCTTATGAGATGGTAATTAAGAAAAATCTGTATTTCAAAAAGTTTCACTGGCGATACCTGGTCATTGAT
GAAGCTCACAGAATAAAGAATGAAAATCTAAGCTTTCAAGAGATTGTTCTGAGATTCAAGTCGACTAACC
GCTTGCTCCTAACTGGAACACCTTTGCAGAATAACCTGCATGAACTGTGGGCCCTACTCAACTTTTTATT
GCCTGATGTCTTTAATCTGCAGATGACTTTGATCTTGGTTTGACACTAAAAATGTCTTGGTGATCAA
AAACTCGTGGAAAGACTTTCATGCAGTTTTAAACCATTTTGTACGCCGTATAAAAACCTGATGTAGAGA
AGAGTCTGCCACCTAAAAAGGAAATAAAGATTTACTTTGGGGCTGAGTAAGATGCAACGAGAATGGTATAC
AAAAATCCTGATGAAAGATATTGATGTTTTAAACTCTTCTGGCAAGATGGACAAGATGCGACTCTTAAAC
ATTCTGATGCAGCTTCGAAAGTGTGTAATCATCCATATCTGTTTGATGGTGTGAACCTGGTCCACCTT
ATACCACTGATGAGCATATTGTCAGCAACAGTGGTAAAATGGTAGTTCTGGATAAACTATTGGCCAACT
CAAAGAACAGGGTTCAAGGGTTCTCATTTTTCAGCCAGATGACTCGCTTGTGATATTTTGGAGATTAT
TGCATGTGGCGTGGTTATGAGTATTGTGCGACTGGATGGACAAAACCCCGCATGAAGAAAGAGAGGATAAAT
TCCTAGAAGTGGAAATTTCTGGGTCAAAGGGAAGCAATAGAGGCTTTTAAATGCTCCTAATAGTAGCAAAT
CATCTTTATGCTAAGTACCAGGGCTGGAGGTCTCGGAATTAACCTGGCAAGTCTGATGTGGTTATACCTA
TATGATTCAGACTGGAACCCACAGGTTGATCTACAAGCTATGGATCGAGCACATCGTATTGGTCAGAAGA
AACCAGTACGTGTATTCCGTCTCATCACTGCACAGCTGTTGAAGAGAGGATTGTAGAAAGAGCTGAGAT
AAAACCTGAGACTCGATTCAATTGTTATACAACAAGGAAGACTCATTGACCAACGGTCTAACAGCTGGCA
AAAGAGGAAATGTTACAAATGATACGGCATGGAGCCACCCATGTTTTTGTCTTAAAGAGAGTGAGTTGA
CAGATGAAGACATTACAACATATTCTGGAAGAGGGGAAAAGAAGACTGCAGAGATGAATGAACGCCTGCA
AAAAATGGGAGAGTCTTCTCTAAGAAATTTTAGAATGGACATTGAACAAAGTTTATACAAATTTGAGGGA
GAAGATTATAGAGAAAAACAGAAGCTTGGCATGGTGAATGGATTGAACCTCTAAACGAGAAGCAAG
CAAACCTACGCAGTGGATGCCTACTTTAGAGAGGCTTTGCGTGTGAGCGAGCCAAAGATTCCAAAGGCTCC
ACGGCCTCCAAAACAGCCAAATGTTTCAGGATTTTCAATTTTTCCACCACGCTATTGAGCTCCTGGAA
AAGGAAATTTCTTTATATCGGAAGACAATAGGCTATAAGGTTCCAAGGAATCCTGATATCCCAAATCCAG
CTCTGGCTCAAAGAGAAGAGCAAAAAAGATTGATGGAGCTGAACCTCTTACACCAGAAGAGACTGAAGA
AAAGGAAAAAATCTTCACACAAGGTTTCACAAACTGGACTAAACGAGATTTTAACCAAGTTTATTAAAGCT
AATGAGAAATATGGAAGAGATGACATTGATAACATAGCTCGAGAGGTAGAGGGCAAATCCCCTGAGGAGG
TCATGGAGTATTACAGCTGATTTTGGGAACGTTGCAATGAATTACAGGACATTGAGAAAATTATGGCTCA
AATTGAACGTGGAGAAGCAAGAATTCAACGAAGGATCAGTATCAAGAAAGCCCTGGATGCCAAAATTGCA
AGATACAAGGCTCCATTTCAATCAGTTGCGCATTCAATATGGAACCAAGCAAGGAAAGAACTATCTGAGG
AAGAAGATAGATTCTTGATTTGTATGTTACACAAAATGGGCTTTGATAGAGAAAATGTATATGAAGAATT
AAGACAGTGTGTACGAAATGCTCCCCAGTTTAGATTGACTGGTTTTATCAAGTCTAGGACTGCCATGGAA
TTCCAGAGACGCTGTAACTCTGATTTCAATGATTGAGAAAGAAAATATGGAATTGAGGAAAGAGAGA
GAGCAGAAAAGAAGAAACGGGCAACTAAACTCCAATGGTAAATTTTCAGCATTTTCTTAACCTTTTAGA
TTTAACTTTGTTGGCCATTTAAATGTGCATATGGAGCAGAACATTAAATCTGTTTCCATTTTAGTCA
CAGAAAAGAAAGCAGAGTCAGCTACTGAGAGCTCTGGAAGAAGGATGTCAAGAAGGTGAAATCTTAAA
GCCTAGAAATAAAGTTTTAAATGGGAACTGCTATTTTCTTGTTCCTTCAAATGCTAATTGCCAGT
TCCAGTGTATTCTAGTACTCTAAGAAAAATCTCTTTGGTTTTGATTTCTTGCATATTTTATATATTTA
CAATGCTTTCTACCTGAAATGTGTAGCTTTATATTTATGGCATTCTAGTATTTTGTGTACTGTATTTT
GTGCATTTCTATGCTCTCATCAAAATCCTCTCAGTCTTGTCTTTTGAAGCTTGTGCTGAGGTTTTAGCT
TTTCTATGTTTTATATGCGCTGCTTTGAAAGAGAACCTAGATTCTATAGTTGTATTATTGTTGTTTCAT
ACTTTAAATTTATATGGCTGTGGAAGAACGAATAAATGTTTTGAGGAGAAAGAAAAA

CHRA1

SEQ ID NO:136
>gi 8393115 ref NM_017444.1 Homo sapiens chromatin accessibility complex 1 (CHRA1), mRNA
ATGGCGGACGTGGTTCGTGGGTAAAGACAAGGGCGGGGAGCAGCGGCTCATCTCGCTGCCTCTATCCCGCA
TCCGGGTCATCATGAAGAGCTCCCCGAGGTGTCCAGCATCAACCAGGAGGCGTTGGTGCTCACGGCCAA
GGCCACGGAGCTCTTTGTTCAATGCCTAGCCACCTATTCCTACAGACACGGCAGTGGAAGGAAAAGAAA
GTACTGACTTACAGTGATTTAGCAAACTGCACAGCAATCAGAACTTTTCAGTTTCTTGACAGATATAT
TACCAAAGAAGATTTTAGCTAGTAAATACCTGAAAATGCTTAAAGAGGAAAAGAGGGAAGAAGATGAGGA
GAATGACAATGATAATGAAAGTGACCATGATGAAGCTGACTCCTAA

5

10

15

20

25

Claims

1. An RNAi molecule derived from a nucleic acid molecule comprising a
5 nucleic acid sequence selected from the group consisting of:
 - a) a nucleic acid sequence as represented by the sequences in SEQ ID NO's:
7-23, or fragment thereof;
 - b) a nucleic acid sequence which hybridises to the nucleic acid sequences of
SEQ ID NO's: 7-23 and encodes a Notch signalling target gene;
 - 10 c) a nucleic acid sequence which comprise sequences which are degenerate
as a result of the genetic code to the nucleic acid sequences defined in (i)
and (ii).
2. An RNAi molecule according to Claim 1 wherein said molecule comprises a
15 first part linked to a second part wherein said first and second parts are
complementary over at least part of their length and further wherein said first and
second parts form a double stranded region by complementary base pairing over at
least part of their length.
- 20 3. An RNAi molecule according to Claim 2 wherein said first and second parts
are linked by at least one nucleotide base.
4. An RNAi molecule according to Claim 3 wherein said first and second parts
25 are linked by 2, 3, 4, 5, 6, 7, 8, 9, or 10 nucleotide bases.
5. An RNAi molecule according to Claim 2 wherein said linker is at least 10
nucleotide bases.
- 30 6. An RNAi molecule according to any of Claims 1-5 wherein the length of said
RNAi molecule is between 10 nucleotide bases (nb) –1000nb.

- 7 An RNAi molecule according to Claim 6 wherein the length of said RNA molecule is selected from 10nb; 20nb; 30nb; 40nb; 50nb; 60nb; 70nb; 80nb; or 90nb.
- 5 8 An RNAi molecule according to Claim 6 wherein said RNA is 21nb in length.
- 9 An RNAi molecule according to Claim 6 wherein said RNA molecule is 100nb; 200nb; 300nb; 400nb; 500nb; 600nb; 700nb; 800nb; 900nb; or 1000nb in length.
- 10
10. An RNAi molecule according to any of Claims 1-5 wherein said RNA molecule is at least 1000nb.
11. An RNAi molecule according to any of Claims 1-10 wherein said RNAi molecule comprise modified nucleotide bases.
- 15
12. A nucleic acid molecule encoding at least part of a gene which modulates stem cell differentiation comprising a nucleic acid sequence selected from the group consisting of:
- 20 a) a nucleic acid sequence as represented by the sequences in SEQ ID NO: 7-23, or fragment thereof;
- b) a nucleic acid sequence which hybridises to the nucleic acid sequences of SEQ ID NO: 7-23 and is a Notch signalling target gene;
- 25 c) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii) wherein said nucleic acid molecule comprises a first part linked to a second part which first and second parts are complementary over at least part of their length, which nucleic acid molecule is operably linked to at least one further nucleic acid molecule capable of promoting transcription of said nucleic acid linked thereto and further wherein said first
- 30 and second parts form a double stranded region by complementary base

pairing over at least part of their length as or when said nucleic acid molecule is transcribed.

13. An expression vector including an expression cassette comprising at least one
5 nucleic acid molecule according to Claim 12.

14. A method of treatment of an animal, preferably a human, comprising administering an effective amount of at least one RNAi molecule according to any of Claims 1-11 or a vector according to Claim 13, to a subject to be treated.

10

15. An *in vitro* method to modulate the differentiation state of a pluripotential stem cell comprising the steps of:

i) contacting a pluripotential stem cell with at least one inhibitory RNA molecule (RNAi) comprising a sequence of a gene which mediates at least
15 one step in the differentiation of said cell wherein said gene is selected from the group consisting of;

a) a nucleic acid sequence as represented by the sequences in SEQ ID NO: 7-23, or fragment thereof;

b) a nucleic acid sequence which hybridises to the nucleic acid sequences of
20 SEQ ID NO: 7-23 and is a Notch signalling target gene;

c) a nucleic acid sequence which comprise sequences which are degenerate as a result of the genetic code to the nucleic acid sequences defined in (i) and (ii).

(ii) providing conditions conducive to the proliferation of the cell treated in (i)
25 above; and optionally

(iii) maintaining and/or storing said cell.

16. A lineage restricted stem cell or a differentiated stem cell obtainable by the method according to Claim 15.

30

17. A lineage restricted stem cell according to Claim 16 wherein said cell is selected from the group consisting of: haemopoietic stem cell; neural stem cell; bone stem cell; muscle stem cell; mesenchymal stem cell; trophoblastic stem cell; epithelial stem cell (derived from organs such as the skin, gastrointestinal mucosa, kidney, bladder, mammary glands, uterus, prostate and endocrine glands such as the pituitary); endodermal stem cell (derived from organs such as the liver, pancreas, lung and blood vessels).

18. A differentiated cell according to Claim 16 wherein said cell is selected from the group consisting of: a nerve cell; a mesenchymal cell; a muscle cell (cardiomyocyte); a liver cell; a kidney cell; a blood cell (eg erythrocyte, CD4+ lymphocyte, CD8+ lymphocyte; pancreatic β cell; epithelial cell (eg lung, gastric,); an endothelial cell.

19. A cell culture comprising at least one lineage restricted stem cell or differentiated cell according to any of Claims 16-18.

20. An organ comprising a lineage restricted stem cell or a differentiated stem cell according to any of Claims 16-18.

21. A method of treatment of an animal, preferably a human, comprising administering a cell or organ according to any of Claims 16-18 or 20.

Figure 1

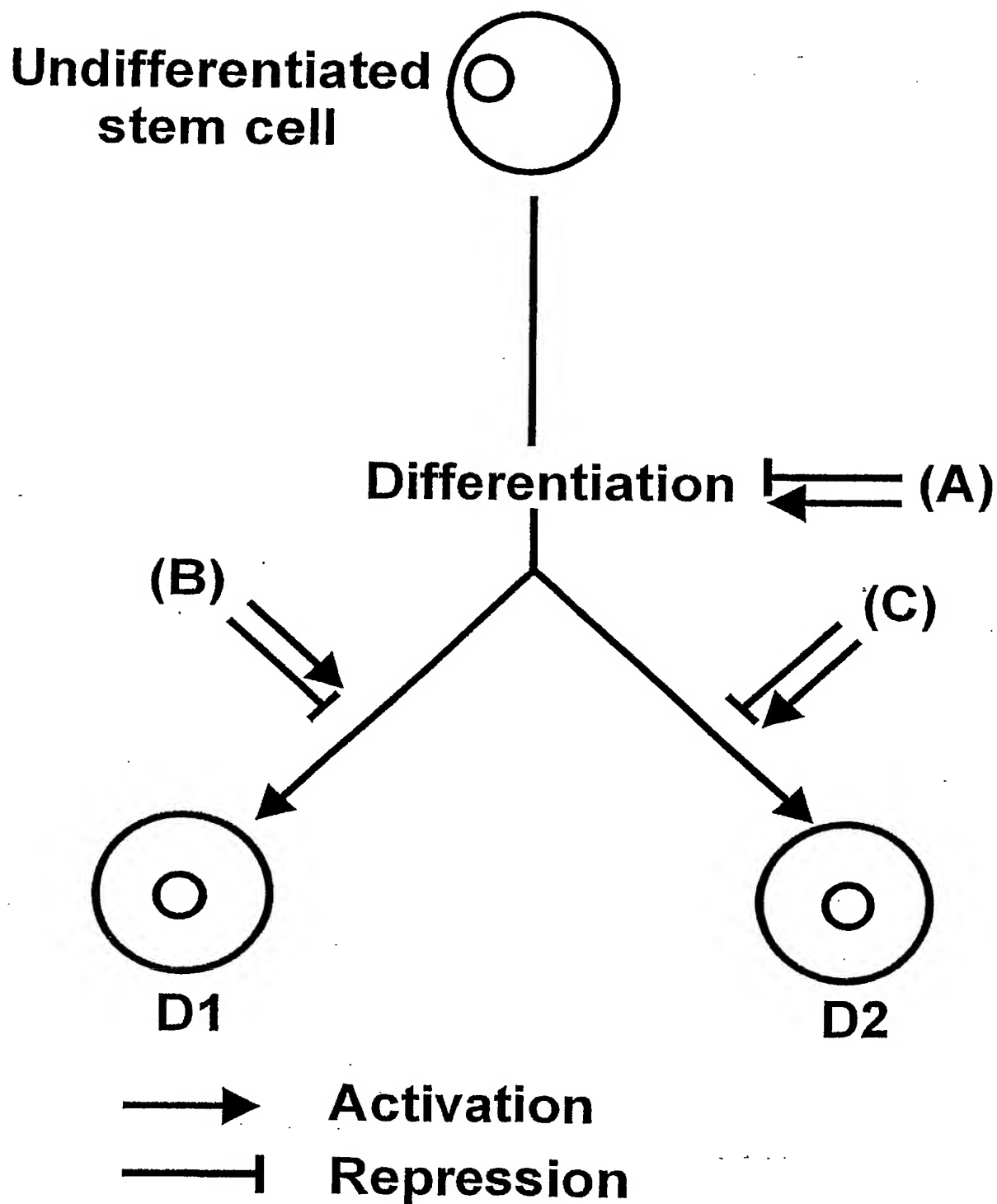
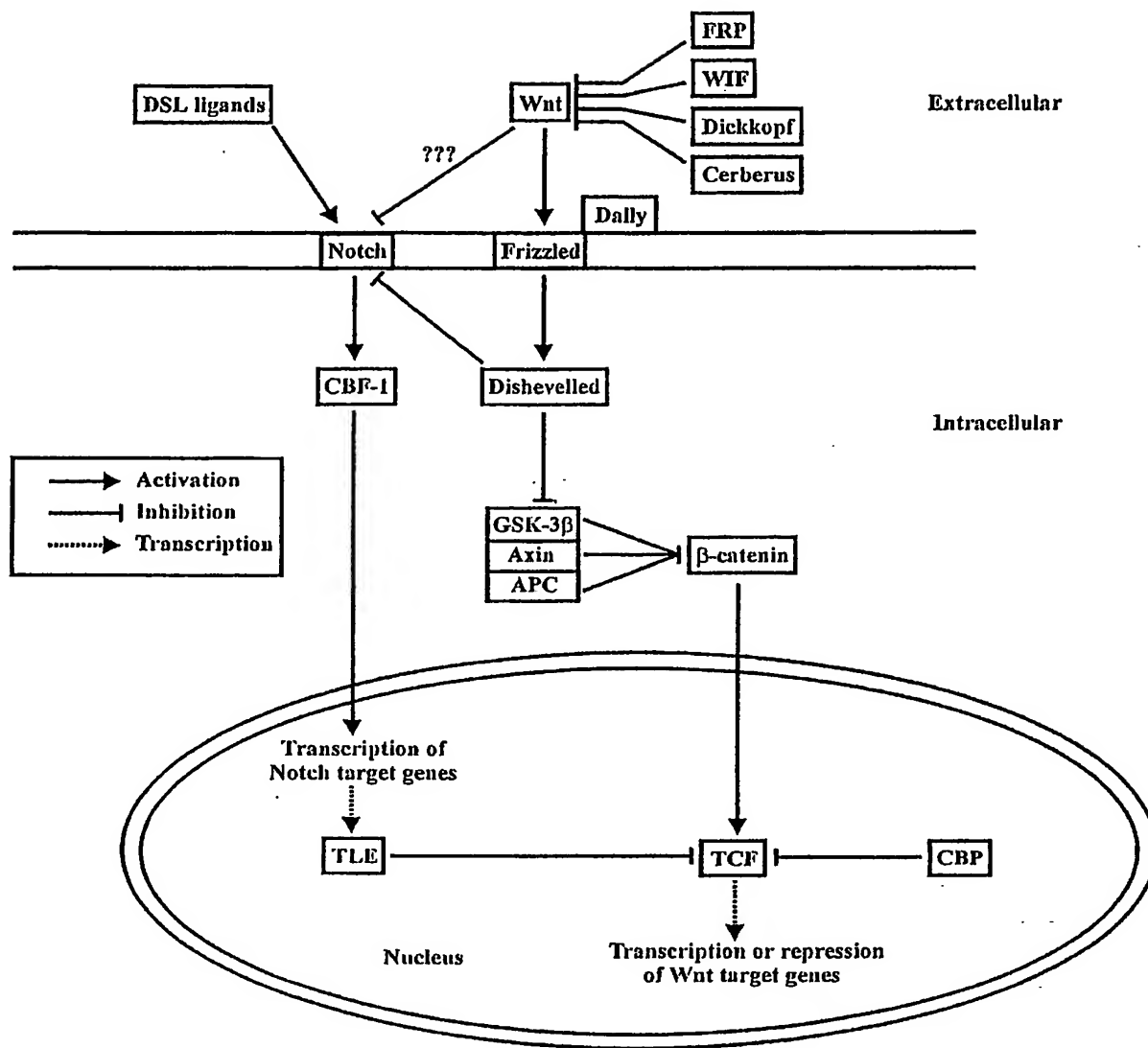


Fig 2



(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 August 2003 (21.08.2003)

PCT

(10) International Publication Number
WO 2003/068961 A3

(51) International Patent Classification⁷: C12N 15/10,
15/11, C07K 14/47, C12N 15/63, 15/85, 5/10, A61K
31/713, 48/00, C12N 5/06

(21) International Application Number:
PCT/GB2003/000579

(22) International Filing Date: 12 February 2003 (12.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0203359.5 13 February 2002 (13.02.2002) GB
0203387.6 13 February 2002 (13.02.2002) GB

(71) Applicant (for all designated States except US): AXORDIA LIMITED [GB/GB]; Firth Court, Sheffield S10 2TN (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ANDREWS, Peter [GB/GB]; Axordia Limited, Firth Court, Sheffield S10 2TN (GB). WALSH, James [GB/GB]; Axordia Limited, Firth Court, Sheffield S10 2TN (GB). GOKHALE, Paul [GB/GB]; Axordia Limited, Firth Court, Sheffield S10 2TN (GB).

(74) Agent: HARRISON GODDARD FOOTE; 31 St. Saviourgate, York YO1 8NQ (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
18 March 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD TO MODIFY DIFFERENTIATION OF PLURIPOTENTIAL STEM CELLS

(57) Abstract: We describe a method to manipulate the phenotype of stem cells, preferably pluripotent stem cells including nucleic acids and vectors used in said methods.

WO 2003/068961 A3

INTERNATIONAL SEARCH REPORT

PCT/GB 03/00579

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C12N15/10 C12N15/11 C07K14/47 C12N15/63 C12N15/85 C12N5/10 A61K31/713 A61K48/00 C12N5/06				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 C12N				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, BIOSIS, Sequence Search, WPI Data, PAJ, SCISEARCH, CHEM ABS Data, BIOTECHNOLOGY ABS				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No. .		
X	ISO TATSUYA ET AL: "HERP, a novel heterodimer partner of HES/E(spl) in notch signaling." MOLECULAR AND CELLULAR BIOLOGY, vol. 21, no. 17, September 2001 (2001-09), pages 6080-6089, XP002253029 ISSN: 0270-7306	12,13		
Y	abstract	1-11, 14-21		
X	----- DATABASE EM PAT [Online] EMBL; 29 October 2001 (2001-10-29), HILLMAN ET AL.: "transcription factors" XP002253031 retrieved from AX274948 accession no. EBI Database accession no. AX274948 abstract ----- -/--	12		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input type="checkbox"/> Patent family members are listed in annex.				
* Special categories of cited documents : <table border="0"> <tr> <td> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family			
Date of the actual completion of the international search 5 September 2003		Date of mailing of the international search report 09. 01. 2004		
Name and mailing address of the ISA European Patent Office, P.B. 5018 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer De Kok, A		

INTERNATIONAL SEARCH REPORT

PCT/GB 03/00579

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	NAGEL ANJA C ET AL: "Neural hyperplasia induced by RNA interference with m4/malpa gene activity." MECHANISMS OF DEVELOPMENT, vol. 98, no. 1-2, November 2000 (2000-11), pages 19-28, XP002253030 ISSN: 0925-4773 page 19 page 23, column 1	1-11, 14-21
A	----- ELBASHIR S M ET AL: "Functional anatomy of siRNAs for mediating efficient RNAi in Drosophila melanogaster embryo lysate" EMBO JOURNAL, OXFORD UNIVERSITY PRESS, SURREY, GB, vol. 20, no. 23, 3 December 2001 (2001-12-03), pages 6877-6888, XP002225998 ISSN: 0261-4189 the whole document	1,8,11
A	----- PADDISON P J CAUDY A A HANNON G J: "Stable suppression of gene expression by RNAi in mammalian cells" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 99, no. 3, 5 February 2002 (2002-02-05), pages 1443-1448, XP002958887 ISSN: 0027-8424 abstract	1-11
A	----- UEDA R: "RNAI: A NEW TECHNOLOGY IN THE POST-GENOMIC SEQUENCING ERA" JOURNAL OF NEUROGENETICS, ELSEVIER, AMSTERDAM, NL, vol. 15, no. 3/4, 2001, pages 193-204, XP001147227 ISSN: 0167-7063 the whole document	1-21
T	----- DATABASE GSN [Online] DERWENT; 26 February 2003 (2003-02-26), TANG ET AL.: "Basic helix loop helix protein encoding sequence" XP002253032 retrieved from ABQ61092 accession no. EBI Database accession no. ABQ61092 abstract	12

INTERNATIONAL SEARCH REPORT

PCT/GB 03/00579

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
Although claims 14 and 21 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the RNAi molecules resp. cells or organs.
2. ☒ Claims Nos.: 1-11, 14-21, all partially
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-21 all partially

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1-11, 14-21, all partially

Present claims 1-11, 14-21 relate to a nucleic acid (and its use) defined by reference to a desirable characteristic or property, namely having inhibitory activity against the gene from which it has been derived. The claims cover all nucleic acids having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such nucleic acids. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the nucleic acid by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the inhibitory nucleic acids defined by the preparation process described on page 28, i.e. double stranded RNA molecules derived from a mRNA sequence defined by seq.id. 7-23, having a size of around 500 base pairs.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-21, all partially

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 7 or 8 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 7 or 8 and encodes a Notch signalling target gene (i.e. HERP) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 7 or 8 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 7 or 8 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

2. claims: 1-21, all partially

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 9 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 9 and encodes a Notch signalling target gene (i.e. HRY) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 9 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 9 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

3. claims: 1-21, all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 10, 11, 22, 23 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 10, 11, 22, 23 and encodes a Notch signalling target gene (i.e. HES) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 10, 11, 22, 23 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 10, 11, 22, 23 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

4. claims: 1-21, all partially

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 12 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 12 and encodes a Notch signalling target gene (i.e. HESR1) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 12 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 12 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

5. claims: 1-21, all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 13 or 14 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 13 or 14 and encodes a Notch signalling target gene (i.e. HEY) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 13 or 14 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 13 or 14 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

6. claims: 1-21, all partially

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 15 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 15 and encodes a Notch signalling target gene (i.e. HEYL) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 15 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 15 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

7. claims: 1-21, all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 16 or 17 or 18 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 16 or 17 or 18 and encodes a Notch signalling target gene (i.e. HRT) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 16 or 17 or 18 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 16 or 17 or 18 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

8. claims: 1-21, all partially

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 19 or 20 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 19 or 20 and encodes a Notch signalling target gene (i.e. CHF) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 19 or 20 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 19 or 20 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.

9. claims: 1-21, all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

An RNAi molecule derived from a nucleic acid comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 21 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 21 and encodes a Notch signalling target gene (i.e. GRIDLOCK) or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); a nucleic acid molecule encoding (part of) a gene which modulates stem cell differentiation comprising (i) a nucleic acid sequence as represented by SEQ.ID.No. 21 or (ii) a nucleic acid sequence which hybridizes to a nucleic acid sequence as represented by SEQ.ID.No. 21 and encodes a Notch signalling target gene or (iii) a nucleic acid sequence which is degenerate to (i) and (ii); an expression vector comprising said nucleic acid; use of said RNAi, said nucleic acid molecule or said vector for modulation of stem cell differentiation in vivo or in vitro and cells and organs obtained by said use.
